

When book is taken out, pls. sign name on card and leave it in the designated card file.

Return book to the Library Office

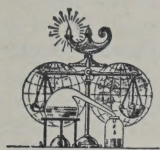
Return book to the Library Office

DATE LOANED	BORROWER'S NAME	DATE RETURNED
	Comptes Rendus [de l'Académie des Sciences et de l'Institut National de Chimie et d'Applic.]	1967.
	Conférence. 24th conf.	1967.

Library
American Chemical Society

COMPTES RENDUS XXIV CONFERENCE

IUPAC
INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY
UNION INTERNATIONALE DE CHIMIE PURE ET APPLIQUÉE



COMPTES RENDUS XXIV CONFERENCE

XXIV

PRAGUE

4 to 10 September 1967

Library
American Chemical Society

QD,
I8815

A publication sponsored by UNESCO

SECRETARY GENERAL:

Dr. R. Morf, c/o F. Hoffmann-La Roche & Co. Ltd., 4002 Basle (Switzerland)

Butterworths Scientific Publication · London

TABLE OF CONTENTS

	Page
Introduction—in French	5
in English	6
Official Delegates of National Adhering Organizations at the XXIVth Conference	7
National Adhering Organizations.	13
Bureau 1967–69	15
Finance Committee.	17
Scientific Editor	17
Coordinating Committee for Analytical Methods	18
Committee on Teaching of Chemistry	18
Inter-Divisional Committee on Nomenclature and Symbols	19
Company Associates	20
International Organizations Associated to IUPAC	25
Section of Clinical Chemistry, Independent Section attached to the Bureau	26
Composition of Divisions	
Physical Chemistry.	28
Inorganic Chemistry	42
Organic Chemistry	46
Macromolecular Division	49
Analytical Chemistry	51
Applied Chemistry	62
Report of the President on the State of the Union	80
Biennial Report of the Treasurer for 1965–66	85
Auditor's Report on Accounts	87
Report of the Finance Committee	91
Report of the Committee on the Teaching of Chemistry	95
Report to Council of XXIVth Conference	98
Proposed IUPAC Committee on Congress Organization and Programmes	100
Agenda for the XXIVth Conference—Council Meeting	
in French	101
in English	102
Minutes of the XXIVth Conference—Council Meeting.	103
Annex to Council Minutes	
Item 8, Council Meeting.	113
Address of Prof. W. Klemm at the opening of the Congress	117
Address to the XXIst Congress	119
Activity Program—Section of Clinical Chemistry.	120
Reports and Activities of Divisions	
Physical Chemistry	121
Inorganic Chemistry	128
Organic Chemistry	142
Analytical Chemistry	144
Applied Chemistry	162

INTRODUCTION DESTINÉE AUX COMPTES-RENDUS DE LA XXIV^e CONFÉRENCE ET DU XXI^e CONGRÈS DE L'UNION INTERNATIONALE DE CHIMIE PURE ET APPLIQUÉE

Avant de décrire les événements qui ont eu lieu à Prague et de rédiger les Comptes-Rendus officiels, c'est le privilège du Secrétaire général, avec le concours de RENÉ TRUHAUT, de rendre hommage à nos hôtes de la République Socialiste Populaire Tchécoslovaque.

Pour la première fois depuis 1955, le Chef de l'Etat et le Premier Ministre Adjoint du pays dont l'IUPAC était l'invitée, ont fait l'honneur aux Membres du Bureau de l'Union Internationale de Chimie Pure et Appliquée de les recevoir. Ce geste, délicat et fort apprécié, démontre de façon spectaculaire l'intérêt que témoigne la République Socialiste Populaire Tchécoslovaque à l'Union Internationale de Chimie Pure et Appliquée.

L'Académie des Sciences de Tchécoslovaquie et son éminent Président, le Professeur F. ŠORM, notre collègue, qui n'a cessé d'honorer l'IUPAC de son amitié, ont manifesté de façon agissante leur intérêt pour les Sciences – la Chimie en particulier. N'est-ce pas d'ailleurs un symbole plein de signification que, parmi les ministres du Gouvernement de la République populaire de Tchécoslovaquie, trois soient des chimistes de carrière.

La séance inaugurale organisée avec un soin particulier par nos hôtes distingués dans la Salle immense du Congrès – représentant un cadre unique au monde – restera dans le souvenir de tous par son exceptionnelle tenue comme l'une des plus marquantes de tous les Congrès de l'IUPAC.

Il va sans dire que tous les participants de la Conférence et du Congrès s'attendaient à goûter la fameuse musique tchèque qui constitue l'un des merveilleux fleurons de la contribution de la Tchécoslovaquie à la culture universelle. Le programme auquel il nous a été donné d'assister a dépassé de loin tous les rêves les plus exigeants. Le dynamisme de l'orchestre et la qualité des deux pièces présentées ont plongé tous les participants dans un enthousiasme traduit par les applaudissements sans fin qui ont salué la terminaison des exécutions. L'on ne saurait manquer de faire ici l'éloge de l'organisation tout entière de la Conférence et de celle du Congrès effectuée sur tous les plans dans une ambiance aussi amicale que généreuse. Il n'est pas jusqu'à la Banque Nationale Tchèque qui n'ait offert ses services à l'IUPAC et ait ainsi facilité le séjour de tous les participants à la Conférence et au Congrès dans une ville riche de culture et d'histoire, riche aussi de perspectives d'avenir infiniment prometteuses.

INTRODUCTION

During the period between 1918–1938, the International Union of Pure and Applied Chemistry organized its conferences each year. Consequently, the activity of IUPAC and its efficient work were *continuously* increasing.

After 1947, transportation by air changed fundamentally the possibilities of international meetings. The number of participants at the conferences increased rapidly, and so did the expenditure for transportation. IUPAC changed over to bi-annual meetings, with the Conferences and Congresses being held only at uneven years. As pointed out in detail in a circular letter to the President and Secretary of all Divisions, Sections and Commissions, the two years interval between IUPAC Conferences (dictated by economical and financial reasons) has the enormous drawback that work is no longer continuous but is generally interrupted by the two years "sleeping period". In the same circular letter, all officers of IUPAC have been urged to overcome this gap, and this problem—by starting work immediately after each Conference, mainly through correspondence.

Before such work can be started, it is essential that the exact composition of all IUPAC units be made known to everyone. The selection and election of Titular Members, Associate Members, and National Representatives must be done with great care. According to the Statutes, National Adhering Bodies must be informed about newly elected members of IUPAC and be given the veto-right.

This is a valuable safe-guard against wrong selections being made on the international level, but the cumbersome procedure involved delays starting of work considerably.

The "Information Bulletin", therefore was published immediately after the XXIVth Conference, giving a tentative picture of the composition of the various Divisions, Sections, and Commissions, with the understanding that the National Adhering Bodies are still given the privilege of making their vetos in case they cannot approve the appointment of IUPAC members to the various working groups. I hope the National Adhering Bodies will understand the necessity of this early and tentative publication.

**OFFICIAL DELEGATES OF NATIONAL ADHERING
ORGANIZATIONS AT THE XXIVth CONFERENCE**

**DÉLÉGUÉS OFFICIELS DES ORGANISATIONS NATIONA-
LES ADHÉRENTES AUPRÈS DE LA XXIV^e CONFÉRENCE**

Argentina (2)

Dr VENANCIO DEULOFEU, Parera 77, Buenos Aires (Argentina)

Australia (6)

Leader of Australian delegation, Dr S. D. HAMANN, CSIRO, GPO Box 4331, Melbourne

Dr I. BROWN, CSIRO Chemical Research Laboratories, Division of Applied Chemistry, Box 4331, GPO, Melbourne (Australia)

Dr A. R. H. COLE, Department of Chemistry, Nedlands (Western Australia)

Austria (2)

Prof. Dr. mult. V. GUTMANN, Institut für Anorganische Chemie der Technischen Hochschule Wien, Getreidemarkt 9, 1060 Wien (Austria)

Prof./Dr. A. MASCHKA, Institut für Allgemeine Chemie der Technischen Hochschule Wien, Lehárgasse 4, 1060 Wien (Austria)

Belgium (6)

Prof. LUCIE DE BROUCKERE, Prof. à la Faculté des Sciences de l'Université Libre de Bruxelles, 50, av. F.-D.-Roosevelt, Bruxelles 5 (Belgique)

Dr M. VAN RYSELBERGHE, Président du Comité national belge de Chimie, Rhode-St-Genèse, Laborelec (Belgique)

Brazil (4)

Represented by Dr VENANCIO DEULOFEU, Parera 77, Buenos Aires (Argentina)

Bulgaria (2)

Prof. DIMITRE M. CHOPOV, Directeur de l'Institut de Chimie organique de l'Académie Bulgare des Sciences, Sofia (Bulgaria)

Canada (6)

Dr R. L. BENOIT, Département de Chimie, Université de Montreal, Montreal P.Q. (Canada)

Dr H. COLLINS, Aluminium Company of Canada, Arvida P.Q. (Canada)

Dr H. E. GUNNING, Département de Chimie, University of Alberta, Edmonton, Alberta (Canada)

Dr LEO MARION, University of Ottawa, Ontario (Canada)

Dr I. E. PUDDINGTON, Division of Applied Chemistry, National Research Council of Canada, Ottawa, Ontario (Canada)

Dr H. G. THODE, McMaster University, Hamilton, Ontario (Canada)

Columbia (2)

Cuba (1)

Czechoslovakia (4)

- Š. BARICA, President of the Slovak Chemical Society, Palackého 32, Bratislava (Czechoslovakia)
R. BRDIČKA, Member of the Czechoslovak Academy of Sciences, Máchova 7, Praha 2 (Czechoslovakia)
F. ČŮTA, President of the Czechoslovak Chemical Society, Hradčanské nám. 12, Praha 1 (Czechoslovakia)
F. ŠORM, President of the Czechoslovak Academy of Sciences, Flemingovo nám. 2, Praha 6 (Czechoslovakia)

Denmark (6)

- Prof. KJAER ANDERS, Department of Organic Chemistry, Den Kgl Veterinaer-og Landbohøjskole, Bülowsvej 13, Copenhagen (Denmark)
Dr P. H. FINK, c/o Sadolin og Holmblad, Holmbladsgade 70, Copenhagen (Denmark)
Prof. Dr K. A. JENSEN, Chemical Laboratory 11, H. C. Ørsted Institute, Universitetsparken 5, Copenhagen (Denmark)
Prof. RAASCHOU-NIELSEN, Lak- og Farveindustriens Forsøgslaboratorium, Odensegade 14, Copenhagen (Denmark)
Prof. STIG VEIBEL, Department of Organic Chemistry, Polyteknisk Læreanstalt, Bygning 201, Lyngby (Denmark)

Finland (4)

- Dr JORI LARINKARI, Central Chemical Association, Box 10058, Helsinki 10 (Finland)
Prof. REINO NASANEN, Dept. of Chemistry, University of Helsinki, Hallituskatu 5, Helsinki 17 (Finland)
Dr N. E. SARIS, The University of Helsinki Central Hospital, Haartmaninkatu 4, Helsinki 29 (Finland)
Dr HEIKKI SUOMALAINEN, The Finnish State Alcohol Monopoly (Alko), Box 10350 Helsinki 10 (Finland)

France (6)

Two Bureau Members (*ex officio*):

- Prof. J. BENARD, Faculté des Sciences de Paris, 11, rue Pierre-Curie, Paris 5^e (France)
M. J. BROCARD, directeur honoraire des Recherches et du Développement, Etablissements KUHLMANN, 1, rue Pasteur, 92-Garches (Hauts-de-Seine) (France)
Prof. G. CHARLOT, Faculté des Sciences de Paris, 10, rue Vauquelin, Paris 5^e (France)
M. J. GIVAUDON, Ingénieur-Conseil à l'Union des Industries chimiques, 81, avenue Bosquet, Paris 7^e (France)
Prof. J. LECOMTE, membre de l'Institut, directeur de recherches au CNRS, Président de la délégation française, 6, rue de l'Alboni, Paris 16^e (France)
Prof. G. OURISSON, Faculté des Sciences de Strasbourg, 2, rue Calmette, 67-Mundolsheim (Bas-Rhin) (France)
Prof. M. PRETTRE, Faculté des Sciences de Lyon, 39, bd 11-Novembre-1918, 69-Villeurbanne (Rhône) (France)
Prof. R. TRUHAUT, Faculté de Pharmacie, Université de Paris, 4, avenue de l'Observatoire, Paris 6^e (France)

Germany (6)

- Dr D. BEHRENS, DECHEMA, Postfach 7746, 6 Frankfurt (Germany)
Prof. Dr W. FISCHER, Institut für Anorganische Chemie der Technischen Hochschule, Callinstr. 46, 3 Hannover (Germany)
Prof. Dr OTTO HORN, Farbwerke Hoechst AG, 623 Frankfurt/M. Hoechst (Germany)
Prof. Dr H. KAISER, Institut für Spektrochemie, Bunsen-Kirchhoff-Str. 46 Dortmund (Germany)
Prof. Dr F. WEYGAND, Organ.-Chem. Institut der Technischen Hochschule, Arcisstr. 21, 8 München 2, (Germany)
Dr R. WOLF, Gesellschaft Deutscher Chemiker, Postfach 9075, 6 Frankfurt (Germany)

Greece (1)

- Dr IRENE DILARIS, The Association of Greek Chemistry, 27 Kaningos Street, Athens 147 (Greece)

Hungary (2)

- Prof. Dr L. ERDEY, Gellert ter. 4., Budapest XI (Hungary)
Prof. Dr G. SCHAY, Pusztaszeri ut. 57/69, Budapest II (Hungary)

India (4)

Ireland (1)

- Dr VINCENT C. BARRY, Treasurer of the Royal Irish Academy, 67 Garville Avenue, Dublin 6 (Ireland)

Israel (4)

- Prof. M. ARIEL, The Israel Chemical Society, c/o Dept. of Chemistry, TECHNION, Israel Institute of Technology, Haifa (Israel)
Prof. S. SAREL, The Israel Chemical Society, c/o Dept. of Chemistry, TECHNION, Haifa (Israel)

Italy (6)

- Prof. ALBERTO BRECCIA FRATADOCCHI, Secretary of the Chemical Committee Consiglio Nazionale delle Ricerche, Piazzale delle Scienze 7, Roma (Italy)
Prof. ALFONSO MARIA LIQUORI, Istituto di Chimica fisica, Università di Roma, Piazzole delle Scienze 5, Roma (Italy)
Prof. LAMBERTO MALATESTA, Istituto di Chimica generale, Università di Milano, Via C. Saldini, 50, Milano (Italy)
Prof. G. BATTISTA MARINI-BETTOLO, Direttore dell'Istituto Superiore di Sanità, Viale Regina Elena, 300, Roma (Italy)
Prof. GUIDO SARTORI, Istituto di Chimica generale e inorganica, Università di Roma, Piazzale delle Scienze 5, Roma (Italy)
Prof. GIOVANNI SEMERANO, Istituto di Chimica fisica, Università di Bologna, Via Selmi 2, Bologna (Italy)

Japan (6)

- Prof. T. FUJINAGA, Faculty of Science, Kyoto University, Kyoto (Japan)
Prof. S. MIZUSHIMA, Japan Academy, 2-698 Tamagawa-Denenchofu, Setagaya-ku, Tokyo (Japan)
Prof. Y. MORINO, Faculty of Science, University of Tokyo, Hongo, Tokyo (Japan)
Prof. S. SHIBATA, Faculty of Pharmacy, University of Tokyo, Hongo, Tokyo (Japan)
Prof. N. TANAKA, Faculty of Science, Tohoku University, Sendai (Japan)
Prof. T. UKITA, Faculty of Pharmacy, University of Tokyo, Hongo, Tokyo (Japan)

Luxembourg (1)

Mexico (1)

Netherlands (6)

- Prof. Dr J. H. DE BOER, President, Duinweg 24, 's-Gravenhage (Netherlands)
Prof. Dr H. A. BOEKENOOGEN, Overasebaan 5, Rijsbergen (Netherlands)
Prof. Dr G. J. M. VAN DER KERK, Emmalaan 11, Utrecht (Netherlands)
Dr W. M. SMIT, Fysisch Chemisch Instituut TNO, Croesestraat 77A, Utrecht (Netherlands)
Drs H. J. Vos, Populierenlaan 1a, Bosch en Duin, Zeist (Netherlands)
Dr J. DE WAEL, Ingenhouzstraat 43, Utrecht (Netherlands)

New Zealand (2)

- Prof. L. H. BRIGGS, University of Auckland, P.O. Box 2175, Auckland (New Zealand)
Dr J. C. DACRE, University of Otago, Dunedin (New Zealand)

Nigeria (1)

Norway (4)

Poland (4)

- Prof. B. KAMIENSKI (chairman) (Poland)
Prof. W. KEMULA (Poland)
Prof. B. TRZEBIATOWSKA (Poland)
Prof. T. URBANSKI (Poland)

Portugal (2)

- Prof. JOSÉ ALBERTO NUNES CORREIA RALHA, Sociedade Portuguesa de Química e Física Faculdade de Ciências, Lisboa 2 (Portugal)

Republic of China (4)

- Dr MIN-SAN HSIEH, President of the Chinese Chemical Society, P.O. Box 609, Taipei, Taiwan (Republic of China)
Dr RUE TCHAO, c/o Chinese Chemical Society, P.O. Box 609, Taipei, Taiwan (Republic of China)
Dr PAUL, L. C. HAO, Vice-President, c/o Chinese Petroleum Corporation Taipei, Taiwan (Republic of China)

Republic of Korea (2)

Republic of South Africa (4)

Prof. FRANK LOUIS WARREN, Dean, Faculty of Science, Cape Town (South Africa)

Republic of Vietnam (2)

Rumania (2)

Prof. CORIOLAN DRAGULESCU, Rumanian Academy, Bucharest (Rumania)

Prof. CRISTOFOR SIMIONESCU, Rumanian Academy, Bucharest (Rumania)

Spain (4)

A. PÉREZ-MASIA

R. PÉREZ-A. OSSORIO

Sweden (6)

Prof. DAVID DYRSSEN, University of Gothenburg, Gibraltargatan 5A, Göteborg S (Sweden)

Dr C. O. GABRIELSON, Mo och Domsjö AB, Örnköldsvik (Sweden)

Prof. HARRY LUNDIN, Royal Institute of Technology, Stockholm 70 (Sweden)

Prof. OLAF SAMUELSON, Chalmers Institute of Technology, Göteborg S (Sweden)

Prof. LENNART STOCKMAN, Royal Institute of Technology, Stockholm 70 (Sweden)

Prof. STIG SUNNER, Thermochemistry Laboratory, University of Lund, Tornavägen 13, Lund (Sweden)

Switzerland (6)

Prof. E. CHERBULIEZ, 48, Fossard, 1211 Conches (Switzerland)

Prof. P. FAVARGER, Lab. de biochimie médicale, 20, rue de l'Ecole de Médecine, 1211 Genève (Switzerland)

Prof. J. FREI, Lab. central de l'Hôpital cantonal, 1000 Lausanne (Switzerland)

Dr M. SANZ, Centre de Chimie clinique, 30, bd de la Cluse, 1200 Genève (Switzerland)

Dr W. SCHOENIGER, Mikroanalyt. Abteilung, Sandoz AG, 4002 Basel 13 (Switzerland)

Prof. Dr H. ZOLLINGER, Techn.-Chem. Lab. der ETH, Universitätstr. 6, Zürich (Switzerland)

Turkey (1)

Union of Soviet Socialist Republics (7)

Prof. V. KONDRATIEV

Prof. I. ALIMARIN

Prof. H. KOTCHETKOV

Dr H. GELMAN

Prof. M. DUBININ

Dr A. DAVYDOV

Dr G. LEPILIN

United Arab Republic (2)

United Kingdom(6)

- Prof. J. S. ANDERSON, University of Oxford, Inorganic Chemistry Laboratory, South Parks Road, Oxford (UK)
Prof. D. H. R. BARTON, Department of Chemistry, Imperial College, Imperial Institute Road, London SW 7 (UK)
Dr D. C. MARTIN: 6 Carlton House Terrace, London S.W. 1
Prof. F. MORTON, Department of Chemical Engineering, University of Manchester Institute of Science and Technology, Sackville Street, Manchester 1 (UK)
Dr J. D. ROSE, Imperial Chemical House, Millbank, London SW 1 (UK)
Prof. H. W. THOMPSON, St. John's College, Oxford (UK)
Prof. T. S. WEST, Chemistry Department, Imperial College of Science, South Kensington, London SW 7 (UK)

United States of America (1)

- Mr PHILIP M. ARNOLD, Vice-President, Research and Development, Phillips Petroleum Company, Bartlesville, Oklahoma (USA)
Prof. PAUL J. FLORY, Jackson-Wood Professor of Chemistry, Stanford, California (USA)
Dr FRANKLIN A. LONG, Vice-President for Research and Advanced Studies, Cornell University, Ithaca, New York (USA)
Dr MARTIN A. PAUL, Executive Secretary Division of Chemistry and Chemical Technology National Academy of Sciences-National Research Council, 2101 Constitution Avenue, N.W., Washington, DC 20418 (USA)
Dr KENNETH S. PITZER, President, Rice University, Houston, Texas (USA)
Dr BYRON RIEGEL, Director of Chemical Research and Development, G.D.Snearle & Company Chicago, Illinois (USA)
Dr M. KENT WILSON, Head, Chemistry Section, Division of Mathematical and Physical Sciences National Science Foundation, Washington, DC 20418 (USA)

Venezuela (1)

Yugoslavia (2)

- Prof. D. DIMITRIJEVIC, Ruzveltova 31, Beograd (Yugoslavia)
Prof. R. KAVCIC, Ljubljana, Ilirska 8 (Yugoslavia)

NATIONAL ADHERING ORGANIZATIONS ORGANISMES NATIONAUX ADHÉRENTS

Argentina	Asociación Química Argentina Sánchez de Bustamante 1749, Buenos Aires
Australia	Australian Academy of Science Gordon Street, Canberra City A.C.T.
Austria	Verein Österreichischer Chemiker Eschenbachgasse 9, Wien I
Belgium	Comité National de Chimie, Palais des Académies, Bruxelles
Brazil	Associação Brasileira de Química Caixa Postal 550, Rio de Janeiro
Bulgaria	Bulgarian Academy of Sciences Street of the 7th November, Sofia
Canada	National Research Council, Division of Chemistry Ottawa
Colombia	Ministerio de Minas y Petroleos, Laboratorio Químico Nacional Apartado 2577, Bogotá
Cuba	Comisión Nacional de la Academia de Ciencias de la República de Cuba Capitolio Nacional, La Habana
Czechoslovakia	Czechoslovak Chemical Society, Československá společnost chemická Hradčanské Nám 12, Prague-Hradčany
Denmark	Danske Kemiske Foreningers Fællesråd for internationalt Sam- arbejde, 83, Sølvgade, Copenhagen K
Finland	Suomen Kemistien Valtuuskunta P.O.B. 58, Helsinki
France	Comité National de la Chimie 28, rue St-Dominique, Paris 7 ^e
Germany	Deutscher Zentrallausschuss für Chemie Carl-Bosch-Haus, Varrentrappstrasse 40/42 Postschliessfach 9075, Frankfurt/Main
Greece	Union des Chimistes Hellènes rue Kaningos 27, Athènes
Hungary	Hungarian Academy of Sciences Pusztaszeri ut 57/69 Budapest II
India	Ministry of Scientific Research and Cultural Affairs Government of India, New Delhi
Ireland	The Secretary, The Irish National Committee for Chemistry Royal Irish Academy, 19, Dawson Street Dublin 2
Israel	The Israel Academy of Sciences and Humanities P.O.B. 7032, Jerusalem
Italy	Consiglio nazionale delle Ricerche, Comitato per la Chimica Piazzale delle Scienze 7, Rome
Japan	Science Council of Japan Ueno Park, Tokyo

- Luxembourg Section des Sciences de l'Institut grand-ducal du Luxembourg
Place Auguste-Laurent, Luxembourg
- Mexico Sociedad Química de México
Apdo. postal 18875, Cipres 176, México 4 D.F.
- Netherlands Chemical Council of the Netherlands
c/o Koninklijke Nederlandse Chemische Vereniging,
Burnierstraat 1, The Hague
- New Zealand The Royal Society of New Zealand, Victoria University
Buildings, P.O.Box 196, Wellington
- Nigeria Science Association of Nigeria, Zoology Department
University of Ibadan, Ibadan
- Norway Norsk Kjemisk Selskap
Rosenkrantzgt. 7, Oslo 1
- Poland Warsaw University
Pasteura 1, Warsaw
- Portugal Sociedade Portuguesa de Química e Física, Faculdade de Ciencias
Rua da Escola Politecnica, Lisboa-2
- Republic of China Chinese Chemical Society
P.O.B. 609, Taipei/Taiwan
- Republic of South Africa Council for Scientific and Industrial Research
The Head, Science Cooperation Division, P.O. Box 395, Pretoria
- Republic of Korea Korean Chemical Society
199, Dongsung-Dong, Seoul
- Republic of Vietnam Vietnamese Chemical Society,
Office de l'Énergie atomique
Boîte postale Q 16, Saigon
- Rumania Académie de la République populaire roumaine
Calea Victoriei 125, Bucarest
- Spain Consejo Superior de Investigaciones Científicas
Instituto Alonso Barba de Química, Serrano 119, Madrid 6
- Sweden Svenska Nationalkommittén för Kemi
c/o Svenska Kemistsamfundet
Wenner-Gren Center, Stockholm VA
- Switzerland Comité suisse de la Chimie
Ecole de Chimie, 22, bd des Philosophes, Genève
- Turkey Turkish Chemical Society
Horbiye, Halaskargazi Caddesi
No 53 D8 Uzay Apt., P.O.Box 829, Istanbul
- Union of Soviet Socialist Republics Academy of Sciences
Leninskii prospect 14, Moscow V-71
- United Arab Republic National Research Council
Ministry of Education, Sh. al-Tahrir, Dokki, Cairo
- United Kingdom British National Committee for Chemistry
The Royal Society, London W 1
- United States of America Division of Chemistry and Chemical Technology,
National Research Council
2101 Constitution Avenue, Washington 20418, DC
- Venezuela Instituto Venezolano de Investigaciones Científicas
Apartado 1827, Caracas
- Yugoslavia Union des Sociétés chimiques de la RSFY
Boîte postale 494, Belgrade

BUREAU 1967-1969

Executive Committee

Prof. V. N. KONDRATIEV	(USSR)
Dr A. L. G. REES	(Australia)
Prof. W. KLEMM	(Germany)
Dr R. MORF	(Switzerland)
Prof. J. C. BAILLAR, Jr	(USA)
Prof. J. LECOMTE	(France)
Prof. H. W. THOMPSON	(UK)
Prof. O. WICHTERLE	(Czechoslovakia)

President

- 1967-1969 KONDRATIEV, V. N., Prof.
Academy of Sciences, Institute of Chemical Physics
Vorobjevskoje chaussée 2b, Moscow V-334 (USSR)

Past-President

- 1967-1969 KLEMM, W., Prof.
Anorganisch-chemisches Institut der Universität
Hindenburgplatz 55, D-44 Münster, Westfalen (Germany)

Vice-President

- 1967-1969 REES, A. L. G., Dr
CSIRO, Chemical Research Laboratories
GPO-Box 4331, Melbourne (Australia)

Secretary General

- 1967-1971 MORF, R., Dr
c/o F. Hoffmann-La Roche & Co. Ltd
CH-4002 Basle (Switzerland)

Treasurer

- 1967-1971 BAILLAR, Jr, J. C., Prof.
Department of Chemistry and Chemical Engineering
University of Illinois, Urbana, Illinois (USA)

Elected Members

- 1963-1969 DEULOFEU, V., Prof.
Facultad de Ciencias Exactas y Naturales
Parera 77, Buenos Aires (Argentina)
- 1963-1969 GABRIELSON, C. O., Dr
Mo & Domsjö AB
Ornsköldsvik (Sweden)
- 1963-1969 GINSBURG, D., Prof.
Technion, Israel Institute of Technology
P.O. Box 4910, Haifa (Israel)
- 1961-1969 GOVINDACHARI, T. R., Dr
Director, CIBA Research Centre
Goregaon East, Bombay-62 (India)

- 1963-1971 LECOMTE, J., Prof.
Membre de l'Institut
6, rue de l'Alboni, Paris 16^e
- 1965-1969 MALISSA, H., Prof.
Technische Hochschule
Getreidemarkt 9, Vienna (Austria)
- 1965-1969 MARION, L., Prof.
Dean, Faculty of Science, University of Ottawa
Ottawa (Canada)
- 1967-1971 SARTORI, G., Prof.
Istituto di Chimica generale ed inorganica
Università di Roma, Piazzale delle Scienze 5, Roma (Italy)
- 1967-1971 SHIBATA, S., Prof.
Faculty of Pharmaceutical Sciences, University of Tokyo
Bunkyo-ku, Tokyo (Japan)
- 1963-1971 THOMPSON, H. W., Prof. (also *ex officio*)
F.R.S., St. John's College
Oxford (UK)
- 1967-1971 WEYGAND, F., Prof.
Org.-chem. Inst., Techn Hochschule
Arcisstrasse 21, 8 München 2 (Germany)
- 1961-1969 WICHTERLE, O., Prof.
Institute of Macromolecular Chemistry
Petržiny, Prague 6 (Czechoslovakia)

Ex officio Member:

TRUHAUT, R., Prof.
Université de Paris, Faculté de Pharmacie,
Chaire de Toxicologie
4, avenue de l'Observatoire, Paris 6^e

Division Presidents:

Physical Chemistry (I)

MELVILLE, Sir HARRY, K.C.B., F.R.S.
Principal Queen Mary College
Mile End Road, London E 1

Inorganic Chemistry (II)

BENARD, J., Prof.
Faculté des Sciences de Paris, 11, rue Pierre-Curie
Paris 5^e (France)

Organic Chemistry (III)

BARTLETT, P. D., Prof.
Harvard University, Department of Chemistry, 12 Oxford St.
Cambridge, Massachusetts, 02138 (USA)

Macromolecular Chemistry (IV)

WICHTERLE, O., Prof.
Institute of Macromolecular Chemistry
Petržiny, Prague 6 (Czechoslovakia)

Analytical Chemistry (V)

WEST, P. W., Prof.

Chemistry Department, Louisiana State University
Baton Rouge 3, Louisiana (USA)

Applied Chemistry (VI)

GALLAY, W., Dr

The E. B. Eddy Co., Hull P.Q. (Canada)

FINANCE COMMITTEE

Chairman

ARNOLD, P. M., Mr

Phillips Petroleum Co.
Bartlesville, Oklahoma (USA)

Members

BARRETT, J. W., Dr

Monsanto Chemicals, Monsanto House
10 Victoria St., London SW 1 (UK)

BROCARD, M. J., Mr

directeur honoraire des Recherches et du Développement
Etablissements Kuhlmann
1, rue Pasteur, 92 Garches (Hauts-de-Seine) (France)

GABRIELSON, C. O., Dr

Mo & Domsjö AB, Ornsköldsvik (Sweden)

HORN, O., Prof. Dr

Farbwerke Hoechst AG
D-623 Frankfurt/Main-Höchst (Germany)

MORF, R., Dr

c/o F. Hoffmann-La Roche & Co. Ltd
CH-4002 Basle (Switzerland)

SCIENTIFIC EDITOR

B. C. L. WEEDON

Queen Mary College
Mile End Road, London E 1 (UK)

Assistant

C. F. CULLIS

Dept of Chemistry, City University
St. John's St., London EC 1 (UK)

COORDINATING COMMITTEE FOR ANALYTICAL METHODS

Chairman TRUHAUT, R., Prof.
Université de Paris
Faculté de Pharmacie, Chaire de Toxicologie
4, avenue de l'Observatoire, Paris 6^e (France)

Members TODD, Lord
University Chemical Laboratory
Lensfield Road, Cambridge (UK)

WEST, P. W., Prof.
Analytical Chemistry Division
Coates Chemical Laboratories
Louisiana State University
Baton Rouge, La. 70803 (USA)

MORF, R., Dr
c/o F. Hoffmann-La Roche & Co. Ltd
4002 Basle (Switzerland)

COMMITTEE ON TEACHING OF CHEMISTRY

Chairman NYHOLM, Sir R., Prof.
University College London, Department of Chemistry
Gower Street, London WC 1 (UK)

Secretary CHISMAN, D.G., Mr.
Science Department, British Council
Albion House, 59, New Oxford Street, London WC 1 (UK)

(Members to be elected)

INTER-DIVISIONAL COMMITTEE ON NOMENCLATURE AND SYMBOLS

- Chairman* JENSEN, K. A., Prof.
University of Copenhagen, Chemical Laboratory II
H. C. Ørsted Institute
Universitetsparken 5, Copenhagen Ø (Denmark)
- Secretary* BELCHER, R., Prof.
Department of Chemistry, The University Edgbaston
Birmingham 15 (UK)
- Members* HOFFMANN-OSTENHOF, O., Prof.
Organisch-chemisches Institut
Währinger Strasse 38, Wien IX (Austria)
- VERKADE, P. E., Prof.
Ary Schefferstraat 217, The Hague (Netherlands)
- WADDINGTON, G., Dr
Office of Critical Tables, National Academy of Sciences
National Research Council
2101 Constitution Avenue Washington, DC 20418 (USA)

COMPANY ASSOCIATES

Mr A. F. GROMACKI

Air Products and Chemicals, Inc.

PO Box 427, Marcus Hook, Pennsylvania 19061 (USA)

Dr N. C. ROBERTSON

Air Products and Chemicals, Inc.

Allentown, Pennsylvania (USA)

Dr G. D. ARQUETTE

Air Reduction Co., Inc.

Murray Hill, N.J. 07971 (USA)

Albright and Willson Ltd.

1, Knightsbridge Green, London SW 1 (UK)

Dr R. O. ROBLIN

Vice-President,

American Cyanamid Company

Wayne, NJ 07470 (USA)

Dr W. P. SCHLICHTER

Bell Telephone Laboratories

Mountain Avenue, Murray Hill, NJ 07971 (USA)

British Hydrocarbon Chemicals Ltd.

Devonshire House, Mayfair Place, London W 1 (UK)

Dr A. SACCARELLO

Direttore Tecnico Centrale, *Carlo Erba*

Via Carlo Imbonati 24, Milano (Italy)

CIBA United Kingdom Ltd.

96, Piccadilly, London W 1 (UK)

Dr G. W. McMILLAN

Commercial Solvents Corp.

1331 South First Street, Terre Haute, Ind. 47808 (USA)

Au Président de *Companhia União Fabril*

Av. Infante Santo, Lisboa 3 (Portugal)

Dr M. G. BRITTON

Manager, Technical Liaison, *corning glass works*

Corning, NY 14830 (USA)

Courtauld's Ltd.

18, Hanover Square, London W 1 (UK)

Mr DANIEL A. HIRSCHLER, Jr

Research and Development, *Ethyl Corp.*

1600 West Eight Mile Road, Ferndale, Mich. 48220 (USA)

Dr HOWARD E. EVERSON

Diamond Alkali

PO Box 348, Painesville, Ohio 44077 (USA)

Distillers Company

Development Division

Research Department

Great Burgh, Epsom, Surrey (UK)

The Dow Chemical Company of Midland

Executive Research Building 566, Midland, Mich. 48640 (USA)

Dr P. L. SALZBERG
Director, Central Research Department
E.I. du Pont de Nemours and Co., Inc.
Wilmington, Del. 19898 (USA)

Scientific Library
Eli Lilly & Company, attention: L. LAGE, Chief Librarian
Indianapolis, Ind. 46206 (USA)

Fison's Limited
Harvest House, Felixtowe, Suffolk (UK)

Dr H. A. DEWHURST, Manager
General Chemistry Laboratory
General Electric Co.
Research and Development Center
PO Box 8, Schenectady, NY 12301 (USA)

Dr G. H. STEMPEL
Research Center Administrator
The General Tire and Rubber Co.
PO Box 951, Akron, Ohio 44309 (USA)

SA Gevaert-Agfa
Mortsel (Belgium)

Glaxo Group
47 Parks Street,
London W 1 (UK)

Dr. J. D. D'IANNI
The *Goodyear Tire and Rubber Co.*
Research Laboratories
142 Goodyear Boulevard, Akron, Ohio 44316 (USA)

Lt General ARTHUR G. TRUDEAU
Gulf Research and Development Company
PO Drawer 2038, Pittsburg, Pa. 15230 (USA)

Dr PETER VAN WYCK
Research Department
Hercules Incorporated
910 Market Street, Wilmington, Del. 19899 (USA)

Imperial Chemical Industries Ltd.
Imperial Chemical House, Mill Bank, London SW 1 (UK)

Istituto Chemioterapico
Italiano SpA
Milano (Italy)

Dr F.L. PUNDSACK
Johns-Manville Products Corp.
Research and Engineering Center
PO Box 159, Manville, NJ 08835 (USA)

Dr W. C. FERNELIUS
Koppers Company, Inc.
440 College Park Drive, Monroeville, Pa. 15146 (USA)

Laport Industries Ltd.
Hanover House
14 Hanover Square, London W 1 (UK)

La Lepetit SpA
Via Lepetit 8, 20124 Milano (Italy)

Dr FRANK H. HEALEY
Vice-President
Lever Brothers Company
45 River Road
Edgewater, NJ 07020 (USA)

Dr HORACE D. BROWN
Director of Scientific Information
Merck Sharp and Dohme Research Laboratories
Division of Merck & Co., Inc.
Rahway, NJ 07065 (USA)

Monsanto Chemicals Ltd.
Monsanto House
10-18 C Victoria Street, London SW 1 (UK)

Dr A. PACE
Owens-Illinois Inc.
PO Box 1035
Toledo, Ohio 43601 (USA)

Dr GEORGE MCCOY
Pennsalt Chemicals Corporation
900 First Avenue, Kind of Prussia, Pa. 19406 (USA)

Dr H. Wakeham
Philip Morris Inc.
4201 Commerce Road, Richmond, Va. 23234 (USA)

Mr PHILIP M. ARNOLD
Vice-President
Research and Development
Phillips Petroleum Company
Bartlesville, Okla. 74003 (USA)

Dr RICHARD W. YOUNG
Vice-President and Assistant
Director of Research
Polaroid Corporation
730 Main Street, Cambridge, Mass. (USA)

Poudreries Réunies
145, rue Royale, Brussels (Belgium)

Power-Gas Corporation
PO Box 21
Stockton-on-Tees, County Durham (UK)

Dr J. S. BROD
The Procter and Gamble Company
Ivorydale Technical Center
Cincinnati, Ohio 45217 (USA)

Dr KAROL J. MYSELS
Research Department
R. J. Reynolds Tobacco Company
Winston-Salem, North Carolina 27102 (USA)

Dr E. M. BEAVERS
Rohm & Haas Co.
Box 219, Bristol, Pa. (USA)

Trust of Czechoslovak
Rubber and Plastics Industry
 R. MACÁK, Technical Director
 Gottwaldov, Louky (Czechoslovakia)

Dr S. A. BALLARD
Shell Development Company
 1400 – 53rd Street, Emeryville, Cal. (USA)
Shell International Petroleum Co. Ltd.
 St. Helen's Court, Great St. Helens, London EC3 (UK)

The State General Chemical Laboratories
 J. CH. SARANTINOS, The General Director
 16, A. Tsocha Street, Athens (Ampelokipi) (Greece)

Stauffer Chemical Company
 Dobbs Ferry, NY (USA)

Dr Bryce Douglas
Smith Kline and French Laboratories
 1500 Spring Garden Street, Philadelphia, Pa. 19101 (USA)

Solvay & Company
 33, rue Prince-Albert, Brussels (Belgium)

Dr E. B. HERSHBERG
Schering Corporation
 60 Orange Street, Bloomfield, NJ 07003 (USA)

Dr HANS WOLFF
 Research Library
A. E. Staley Manufacturing Co.
 2200 E. Eldorado Street, Decatur, Ill. 62525 (USA)

Dr. H. W. COOVER
 Director of Research
Tennessee Eastman Co.
 Kingsport, Tenn. 37662 (USA)

Unilever Ltd.
 Research Division
 Unilever House, London EC 4 (UK)

Dr JOHN A. SWARTOUT, Director of Technology
Union Carbide Corporation
 270 Park Avenue, New York, NY 10017 (USA)

LEONORE ROGALSKI
 Research Library
Universal Oil Products Company
 30 Algonquin Road, Des Plaines, Ill. 60016 (USA)

Dr R. S. SCHREIBER
The Upjohn Company
 Kalamazoo, Mich. 49001 (USA)

Dr ROBERT I. MELTZER
 Director of Chemical Research
Warner-Lambert Research Institute
 Morris Plains, NJ 07950 (USA)

The Wellcome Foundation
 The Wellcome Building, Euston Road, London NW 1 (UK)

Dr J. H. DESSAUER
Xerox Corporation
 PO Box 1540, Rochester, NY (USA)

Dr SYDNEY ARCHER
Sterling-Winthrop Research Institute
 Rensselaer, New York 12144 (USA)

Dr P. J. LUCCHESI
Esso Research and Engineering Company
 PO Box 45, Linden, NJ 07036 (USA)

Mr. JAMES A. ROLL
 Administrative Assistant
Abbott Laboratories
 14th Street and Sheridan Road
 North Chicago, Ill. 60064 (USA)

Union Chimique – Chemische Bedrijven
 4, chaussée de Charleroi
 Bruxelles 6 (Belgium)

Bad. Anilin- und Soda-Fabrik AG
 Farbwerke Hoechst AG
 Farbenfabriken Bayer AG
 C. H. Boehringer Sohn
 Chemische Fabrik Kalk GmbH
 Chemische Werke Hüls AG
 Duisburger Kupferhütte AG
 Dynamit Nobel AG
 Henkel & Cie GmbH
 E. Merck AG
 Sachtleben AG f. Bergbau u. chem. Ind.
 Schering AG
 Union Rhein. Braunkohlen-Kraftstoff AG

INTERNATIONAL ORGANIZATIONS ASSOCIATED TO IUPAC

Federation Chemical Engineering – Offices in Frankfurt, London and Paris

CITCE—International Committee for Electrochemical Thermodynamics
and Kinetics

International Federation of Clinical Chemistry

The names and addresses of New Titular Members, etc., are given – subject
to approval.

SECTION OF CLINICAL CHEMISTRY INDEPENDENT SECTION ATTACHED TO THE BUREAU

Titular Members

Chairman

- 1965-1971 SANZ, M. C., Dr
Centre de Chimie clinique
30, bd de la Cluse, CH-1211 Genève 4 (Switzerland)

Secretary

- 1967-1971 TONKS, D. B., Dr
Division of Clinical Chemistry
The Montreal General Hospital, Montreal 25, P.Q. (Canada)

Members

- 1967-1971 IVANOV, I. I., Prof.
Institute of Experimental Medicine
Kirov Prospect 69/71, Leningrad (USSR)
- 1967-1971 LATNER, A. L., Prof.
Dept. of Clinical Biochemistry
Royal Victoria Infirmary, Newcastle-Upon-Tyne 1 (UK)
- 1967-1971 LOUS, P., Dr
Dept. of Clinical Chemistry
Bispebjerg Hospital, Copenhagen NV (Denmark)
- 1967-1971 METAIS, P., Prof.
Faculté de Pharmacie
39, rue du Conseil des XV, Strasbourg (France)
- 1965-1971 RUBIN, M., Prof.
Dept. of Biochemistry
Georgetown University Hospital, Washington, DC 20037 (USA)
- 1967-1971 ROMAN, W., Prof.
Head of Division of Biochemistry
The Institute of Medical and Veterinary Science
Adelaide (Australia)
- 1965-1971 RUYSEN, R., Prof.
Akademisch Ziekenhuis
De Pintelaan 115, Ghent (Belgium)
- 1965-1971 WAEL, De, J., Prof.
Ingenhouzstraat 43, Utrecht (Netherlands)

Associate Member

JOSEPHSON, B., Prof.
St. Erik's Hospital, Stockholm (Sweden)

National Representatives

Australia CURNOW, D. H., Dr
Royal Perth Hospital, Perth

Belgium Dr H. WACHSMUTH
Kardinaal Mercierlei 16
Antwerpen

Canada PEARCE, T., Dr
Department of Pathology, Faculty of Medicine
University of British Columbia, Vancouver, B.C.

- Czechoslovakia HOREJSI, J., Prof.
Czechoslovakia Biochemical Society
U-Nemocnice 5, Praha
- Denmark DYBKAEER, R., Dr
Universitetets Institut for Almindelig Pathologi
Juliane Maries Vej 22, Copenhagen
- Finland SARIS, N. E., Dr
Helsingfors Universitetscentralsjukhus
Mejlans Klinikerna, Haartmansgatan 4, Helsinki 29
- France LEMONNIER, A., Dr
Laboratoire central de Biochimie
Hôpital de Bicêtre, 94 Kremlin-Bicêtre
- Germany BUTTNER, H., Dr
I. Med. Universitätsklinik
Schittenhelmstrasse 12, 23 Kiel
- Iran GAGUIK, H., Dr
University of Teheran, Fleming Laboratory
Aziz Khan Square, Teheran
- Japan YAMAMURA, Y., Prof.
3rd Dept. of Internal Medicine
Osaka University Hospital, Fukushima (Osaka)
- Netherlands LEYNSE, B., Dr
Terbregseweg 129, Rotterdam
- Norway SKAUG, O. E., Prof.
Centrallaboratoriet, Lier Sykehus, Lier
- Portugal GOMES DA COSTA, S., Prof. Dr
Instituto de Química Fisiologica
Hospital de St Maria, Lisboa
- Sweden AGNER, K., Dr
Department of Clinical Chemistry
St. Görans Sjukhus, Stockholm
- Switzerland ROTH, M., Dr
Head of the Central Laboratory
Hôpital Cantonal, CH-1211 Genève 4
- United Kingdom LEHMANN, H., Dr
Dept. of Biochemistry, Addenbrooke's Hospital
Cambridge
- USA MASON, W., Dr
Department of Biochemistry
University of Rochester Medical School
Rochester NY
- USSR OREKHOVICH, V. N., Prof.
Institute of Biological and Medical Chemistry
of the USSR Academy of Medical Sciences
Pogodin Street 10, Moscow G-117

**PHYSICAL CHEMISTRY DIVISION
DIVISION DE CHIMIE PHYSIQUE**

Division Committee / Comité de Division

Titular Members

President

- 1965-1969 MELVILLE, Sir HARRY, K.C.B., F.R.S.
Principal Queen Mary College
Mile End Road, London E 1 (UK)

Past-President

- 1965-1969 SCHWAB, G.M., Prof.
Physikalisch-Chemisches Institut der Universität
Sophienstrasse 11, 8 München 2 (Germany)

Vice-President

- 1965-1969 WADDINGTON, G., Dr.
Office of Critical Tables
National Academy of Sciences, National Research Council
2101 Constitution Avenue, Washington, DC, 20418 (USA)

Secretary

- 1961-1969 EMSCHWILLER, G., Prof.
Ecole supérieure de Physique et de Chimie
10, rue Vauquelin, Paris 5^e (France)

Members

- 1965-1969 FÖRSTER, T., Prof.
Institut für physikalische Chemie der Technischen Hochschule
Wiederholdstrasse 7 S, Stuttgart (Germany)
- 1965-1969 FRUMKIN, A.N., Prof.
Institute for Electrochemistry, Academy of Sciences
Leninskii Prospekt 31, Moscow V-71 (USSR)
- 1965-1969 OVERBEEK, J.Th.G., Prof.
Van't Hoff Laboratory of Physical Chemistry
The University of Utrecht
Sterrenbos 19, Utrecht (Netherlands)
- 1965-1969 PRETTRE, M., Prof.
Institut de Recherches sur la Catalyse
30, bd de l'Hippodrome, Villeurbanne, Rhône (France)
- 1965-1969 SKINNER, H.A., Dr
Department of Chemistry, University of Manchester
Manchester (UK)
- 1967-1971 STULL, D., Dr
Thermal Research Laboratory, Dow Chemical Company
Midland, Mich. (USA)

Commission:**Physico-Chemical Symbols, Terminology, and Units****Commission:****Symboles, Terminologie, et Unités physico-chimiques****Titular Members***President*

- 1963–1971 MCGLASHAN, M. L., Prof.
Department of Chemistry, The University of Exeter
Stocker Road, Exeter (UK)

Secretary

- 1967–1971 PAUL, M. A., Dr, Executive Secretary,
Division of Chemistry and Chemical Technology,
National Academy of Sciences, National Research Council
Washington, DC 20418 (USA)

Members

- 1965–1969 ASTACHOV, K. V., Prof.
Leninski Prospect 44, KV 157, Moscow B-12 (USSR)
- 1963–1971 BATES, R. G., Dr, Assistant Chief,
Division of Analytical and Inorganic Chemistry
National Bureau of Standards, Washington, DC 20234 (USA)
- 1967–1971 FAYARD, M., Prof.
Laboratoire de Chimie appliquée
11, rue Pierre-Curie, 75 Paris 5^e (France)
- 1963–1971 JAENICKE, W., Prof.
Institut für physikalische Chemie der Universität
Erlangen-Nürnberg, Schuhstr. 19, 8520 Erlangen (Germany)
- 1967–1971 JELLINEK, F., Prof.
Department of Chemistry, University of Groningen
Bloemsingel 10, Groningen (Netherlands)
- 1967–1971 MASIÁ, D. A., PEREZ, Dr
Instituto "Rocasolano", Consejo Superior de Investigaciones
Científicas, Serrano 117, Madrid 6 (Spain)
- 1967–1971 SILLÉN, L. G., Prof.
Department of Inorganic Chemistry
Royal Institute of Chemistry (KTH), Stockholm 70 (Sweden)

Associate Members

SYŪZŌ SEKI, Prof.
Department of Chemistry, Faculty of Science, Osaka University
Toneyama, Toyonaka (Japan)

WADDINGTON, G., Dr, Director
Office of Critical Tables, National Academy of Sciences
National Research Council, Washington, DC 20418 (USA)

I.2 Commission: Thermodynamics and Thermochemistry
Commission: Thermodynamique et Thermochimie

Titular Members

Chairman

- 1965-1969 SKINNER, H. A., Dr
Department of Chemistry
University of Manchester, Manchester (UK)

Secretary

- 1965-1969 SUNNER, S., Dr
Thermochemistry Laboratory
Lund University, Lund (Sweden)

Members

- 1961-1969 BECKETT, C. W., Dr
Heat Division, National Bureau of Standards
Washington, DC, 20234 (USA)
- 1965-1969 FRANCK, E. U., Prof.
Direktor, Institut für Physikalische Chemie und
Elektrochemie der Technischen Hochschule
Engelstrasse 11, D-75 Karlsruhe (Germany)
- 1961-1969 GERASSIMOV, J. I., Prof.
Chemical Department, Moscow State University
Leninskii Gory, Moscow (USSR)
- 1965-1969 ROSSINI, F. D., Prof.
University of Notre Dame
Notre Dame, Ind. (USA)
- 1967-1971 SEKI, S., Prof.
Department of Chemistry
Osaka University, Osaka (Japan)
- 1967-1971 VODAR, B., Prof.
CNRS, Bellevue (S.-et-O.) (France)

Associate Members

- COLOMINA, M., Dr
Jefe de Sección, Instituto de Química-Física
Serrano 119, Madrid 6 (Spain)
- COX, J. D., Dr
National Physical Lab., Chemical Standards Division
Teddington, Midd. (UK)
- DEFFET, L., Dr
Directeur de l'Institut Belge des Hautes Pressions
Val du Bois, Sterrebeek (Belgium)
- GURVICH, L. V., Prof.
Institute of High Temperature
Krasnoka zammennay 17/2, Moscow E-250 (USSR)
- HUBBARD, W. N., Dr
Argonne National Lab., Chemical Engineering Division
9700 S Cass Avenue, Argonne, Ill. (USA)

McGLASHAN, M. L., Prof.
Department of Physical Chemistry
Exeter University, Exeter, Devon (UK)

NEWITT, D. M., Prof.
Department of Chemical Eng.
Imperial College of Science and Technology, London, SW 7 (UK)

SAUREL, J., Prof.
Université de Clermont-Ferrand
Clermont-Ferrand (P.-D.) (France)

SCHAEFER, K., Prof.
Institut für Physikalische Chemie der Universität Heidelberg
Tiergartenstrasse, D-69 Heidelberg (Germany)

SYTCHEV, V. V., Prof. Dr
Scientific Research Institute for High Temperatures
Krasnoka zazmennay 17, Moscow E-250 (USSR)

WADDINGTON, G., Dr
Office of Critical Tables
National Academy of Sciences, National Research Council
2101, Constitution Avenue, Washington, DC, 20418 (USA)

WADSÖ, I., Dr
Thermochemical Laboratory, University of Lund
Tornavägen 13, Lund (Sweden)

WESTRUM, Jr., E. F., Prof.
Department of Chemistry
University of Michigan, Ann Arbor, Mich. (USA)

I.3 Commission: Electrochemistry

Commission: Electrochimie

Status not yet finalized

Titular Members

Chairman

- 1967-1971 JORDAN, J., Prof.
Whitemore Laboratory, Pennsylvania State University
University Park, Pa (USA)

Vice-Chairman

- 1965-1971 FRUMKIN, A.N., Prof.
Institute for Electrochemistry, Academy of Science
Leninskii prospekt 31, Moscow V-71 (USSR)

Secretary

- 1965-1971 KORYTA, J., Prof.
Institute of Polarography
Opletalova 25, Praha 2 (Czechoslovakia)

Members

- 1965-1969 BATES, R.G., Dr
Physical Chemistry Section, National Bureau of Standards
Washington, DC, 20234 (USA)
- 1967-1971 EPELBOIN, I., Dr
Faculté des Sciences
Laboratoire de Physique des liquides et d'Electrochimie
9, quai Saint-Bernard, 75 Paris 5^e (France)
- 1967-1971 HAASE, R., Prof.
Technische Hochschule
D-51 Aachen (Germany)
- 1967-1971 MILAZZO, G., Prof.
Laboratori di Chimica, Istituto superiore di Sanità
Viale Regina Elena 299, Roma (Italy)
- 1967-1971 TAMAMUSHI, R., Dr
Institute of Physical and Chemical Research of University
Yamato-machi, Kita-adachi-gun, Saitama (Japan)

Associate Members

BRUSSET, H., Prof.
Laboratoire de Recherches de Chimie systématique
Faculté des Sciences de l'Université de Paris
24, rue Lhomond, 75 Paris 5^e (France)

DEFAY, R., Prof.
Avenue de l'Orée, Brussels 5a (Belgium)

FISCHER, H., Prof.
Lehrstuhl für Elektrochemie, Technische Hochschule
Engelstrasse 11, D-75 Karlsruhe (Germany)

IBL, N., Prof.
Technisch-Chemisches Laboratorium
Eidgenössische Technische Hochschule
Universitätsstrasse 6, CH-8006 Zürich (Switzerland)

LEVART, E., Dr
Laboratoire d'Electrolyse du CNRS
1, place Aristide-Briand, 92, Bellevue (France)

TANAKA, N., Prof.
Department of Chemistry, Faculty of Science
Tohoku University, Sandai (Japan)

VALENSI, G., Prof.
Laboratoire d'Electrochimie de la Faculté des Sciences
Route de Chauvigny, 86 Poitiers (France)

VAN RYSELBERGHE, P., Prof.
Department of Chemistry and Chemical Engineering
Stanford University, Stanford, Calif., 94305 (USA)

National Representatives

Brazil JORDAN, I., Prof.
Instituto Pesquisas Technologicas
Caixa Postal 7141, Sao Paulo

Great Britain PARSONS, R., Dr
Department of Physical and Inorganic Chemistry of the Univ.
Woodland Road, Bristol 8

Hungary ERDEY-GRUSZ, T., Prof.
Physical Chemistry Department, L. Eötvös University Budapest
Puskín utca 11-13, Budapest VIII.

Italy PIONTELLI, R., Prof.
Laboratorio di Elettrochimica, Politecnico di Milano
Piazza Leonardo da Vinci, 32, Milan 132

Poland MINČ, S., Prof.
University of Warsaw
1 Pasteura, Warsaw

Spain RIUS-MIRÓ, A., Prof.
Consejo Superior de Investigaciones Científicas
Istituto de Química-Física «Rocasolano», Universidad de Madrid
119, Serrano, Madrid

Yugoslavia KARSULIN, M., Prof. Ing.
Institute of Physical Chemistry, Technical Department
Maruliceva trg. 20, Zagreb

Titular Members*Chairman*

- 1967–1971 STULL, D. R., Dr
Dow Chemical Company
1707 Building, Midland, Mich., 48640 (USA)

Vice-Chairman and Secretary

- 1967–1971 HERINGTON, E. F. G., Dr
National Physical Laboratory
Teddington (UK)

Members

- 1965–1969 BROWN, I., Dr
Division of Applied Chemistry, CSIRO
Box 4331, G.P.O., Melbourne (Australia)
- 1963–1971 KIENITZ, H., Dr
Badische Anilin- und Sodafabrik AG
D-67 Ludwigshafen am Rhein (Germany)
- 1967–1971 MASHIKO, Y., Dr
Government Chemical-Industrial Research Institute of Tokyo
1-chome, Honmachi, Shibuya-ku, Tokyo (Japan)
- 1965–1969 MEINKE, W. W., Dr
Division of Analytical Chemistry, National Bureau of Standards
Washington, DC, 20234 (USA)
- 1967–1971 NOVIKOV, I. I., Dr
Ugozapaol
Kwartal 38, Korpus 189 A, Moscow (USSR)
- 1961–1969 PLEBANSKI, T., Dr
National Board for Quality Control and Measures
2 Elektoralna Street, Warsaw 1 (Poland)

Associate Members

- FRANC, J., Dr
Research Institute for Organic Syntheses
Pardubice-Rybitvi (Czechoslovakia)
- SAYLOR, C. P., Dr
National Bureau of Standards, Analytical Chemistry Division
Washington 25, DC, 20234 (USA)
- STAVELEY, L. A. K., Dr
Inorganic Chemistry Laboratory
South Parks Road, Oxford (UK)
- SUNNER, S., Dr
Thermochemistry Laboratory University of Lund
Tornavägen 13, Lund (Sweden)
- WIBAUT, J. P., Prof.
Soerenseweg 125, "Arendsburcht" flat 81
Apeldoorn (Netherlands)

National Representatives

- Canada GRAHAM, R.P., Dr
Department of Chemistry, McMaster University
Hamilton, Ontario
- France TERRIEN, J., Dr
Bureau international des Poids et Mesures
Sèvres (S.-et-O.)
- Germany FEUERBERG, H., Dipl.-Chem.
Bundesanstalt für Materialprüfung
Unter den Eichen 87, D-1 Berlin 45
- India MUKHERJEE, J.N., Dr
10 Puran Chand Nahar Avenue
Calcutta-13
- Italy MILONE, M., Prof.
Director Chemical University
Corso Massimo d'Azeglio 48, Torino
- Netherlands SMIT, W.M., Dr
Institute for Physical Chemistry TNO
Croesestraat 77A, Utrecht

I.5 Commission: Molecular Structure and Spectroscopy Commission: Structure moléculaire et Spectroscopie

Titular Members

Chairman

- 1967-1969 JONES, R.N., Dr
Division of Pure Chemistry, National Research Council of
Canada
Sussex Drive, Ottawa 2 (Canada)

Secretary

- 1965-1969 COLE, A.R.H., Dr
School of Chemistry, University of Western Australia
Nedlands (Australia)

Members

- 1967-1971 ELYASHÉVICH, M.A., Dr
Institute of Physics, Academy of Sciences of BSSR
Leninskii prospekt 70, Minsk (USSR)
- 1967-1969 FÖRSTER, Th., Prof.
Institut für physikalische Chemie der Technischen Hochschule
Wiederholdstrasse, D-7 Stuttgart (Germany)
- 1967-1971 MILLER, F.A., Prof.
Department of Chemistry, University of Pittsburgh
Pittsburgh, Pa. (USA)

- 1967-1969 MORINO, Y., Prof.
Department of Chemistry, Faculty of Science
University of Tokyo, Bunkyo-ku, Tokyo (Japan)
- 1967-1971 SHEPPARD, N., Prof.
Department of Chemistry, University of East Anglia
Norwich (UK)

Associate Members

- LECOMTE, J., Prof.
Membre de l'Institut
6, rue de l'Alboni, Paris 16^e (France)
- LORD, R.C., Prof.
Spectroscopy Laboratory, Massachusetts Institute of Technology
Cambridge, Mass. (USA)
- MECKE, R., Prof.
Institut für Elektrowerkstoffe
Eckerstrasse 4, Freiburg i.Br. (Germany)
- MIZUSHIMA, S., Prof.
698, 2-chome, Tamagawa-Denenchofu
Setagaya-ku, Tokyo (Japan)
- PLIVA, J., Dr
Chemical Institute, Czechoslovak Academy of Science
Machova 7, Prague 2, Vinohrady (Czechoslovakia)
- THOMPSON, H.W., Prof.
St. John's College
Oxford (UK)

Advisory Counsellor

- 1967-1969 HERZBERG, G., Dr
Division of Pure Physics, National Research Council of Canada
Sussex Drive, Ottawa 2 (Canada)

National Representative

- 1967-1969 URBANSKI, T., Prof.
Politechnika, 75, rue Koszykowa, Warsaw 10 (Poland)

I.5.1 Sub-Commission: Infrared and Raman Spectroscopy Sous-Commission: Spectroscopie infrarouge et Raman

Chairman

- 1967-1969 LORD, R.C., Prof.
Spectroscopy Laboratory, Massachusetts Institute of Technology
Cambridge 39, Mass. (USA)

Members

- 1967-1969 COLE, A.R.H., Dr
School of Chemistry, University of Western Australia
Nedlands (Australia)

- 1967-1969 CRAWFORD, B.L., Jr., Prof.
Department of Chemistry, University of Minnesota
Minneapolis 14, Minn. (USA)
- 1967-1969 DUPEYERAT, R., Prof.
Laboratoire des Recherches physiques
Faculté des Sciences, Tour 22
9, quai St-Bernard, Paris 5^e (France)
- 1967-1969 HADNI, A., Prof.
Département de Physique, Université de Nancy
Nancy (France)
- 1967-1969 JONES, R.N., Dr.
Division of Pure Chemistry, National Research Council of Canada
Sussex Drive, Ottawa 2, (Canada)
- 1967-1969 LIPPINCOTT, E.R., Prof.
Department of Chemistry, University of Maryland
College Park, Maryland (USA)
- 1967-1969 MILLS, I.M., Prof.
Department of Chemistry, University of Reading
Reading (UK)
- 1967-1969 WILKINSON, G.R., Dr
Department of Physics, King's College
Strand, London WC 2 (UK)

I.5.2 Sub-Commission:
Storage and Retrieval of Spectroscopic Data
Sous-Commission:
Recueil et Contrôle des Données spectroscopiques

Chairman

- 1967-1969 JONES, R.N., Dr
Division of Pure Chemistry, National Research Council of Canada
Sussex Drive, Ottawa 2 (Canada)

Members

- 1967-1969 KUENTZEL, L.E., Dr
Wyandotte Chemicals Corporation
Wyandotte, Mich. (USA)
- 1967-1969 SAVITZKY, A., Dr
The Perkin-Elmer Corporation
Norwalk, Conn. (USA)
- 1967-1969 SHIMANOUCHI, T., Prof.
Department of Chemistry, Faculty of Science, The University
of Tokyo
Tokyo (Japan)
- 1967-1969 THOMPSON, H.W., Prof.
St. John's College, Oxford (UK)

Commission: Colloid and Surface Chemistry
Commission: Chimie des Colloïdes et des Surfaces

Titular Members

Chairman

- 1965–1969 OVERBEEK, J. TH. G., Prof.
 Van't Hoff Laboratory of Physical Chemistry, University of
 Utrecht
 Sterrenbos 19, Utrecht (The Netherlands)

Vice-Chairman

- 1965–1969 EVERETT, D. C., Prof.
 Department of Physical Chemistry, University of Bristol
 Bristol 8 (UK)

Secretary

- 1967–1971 VAN OLPHEN, H., Dr
 National Research Council, National Academy of Sciences
 2101, Constitution Avenue, Washington, DC, 20418 (USA)

Members

- 1967–1971 BRUNAUER, S., Prof.
 Clarkson College of Technology, Dept of Chemistry
 Potsdam, NY 13676 (USA)
- 1961–1969 DUBININ, M. M., Academician
 Institute of Physical Chemistry, Academy of Sciences
 Moscow (USSR)
- 1961–1969 KAMIENSKI, B., Prof.
 Krakow University
 23 Karłowicza, Krakow (Poland)
- 1965–1969 PRETTRE, M., Prof.
 Institut de Recherches sur la Catalyse
 30, bd de l'Hippodrome, Villeurbanne, Rhône (France)
- 1967–1971 SCHAY, G., Prof.
 Polytechnical University, Department of Physical Chemistry
 Budafoki-ut 8, Budapest XI. (Hungary)

Associate Members

- BORESKOV, G. K., Prof., Director
 Institute of Catalysis
 P. O. B. 164, Novosibirsk 72 (USSR)
- BURWELL, Jr., R. L., Prof.
 Department of Chemistry, Northwestern University
 Evanston, Ill. 60201 (USA)
- HAUL, R., Prof.
 Institut für Physikalische Chemie und
 Elektrochemie der Technischen Hochschule
 Callinstrasse 46, D-3 Hannover (Germany)

HORIUTI, J., Prof.
Research Institute for Catalysis, Hokkaido University
Sapporo (Japan)

MYSELS, K.J., Dr
R. J. Reynolds Tobacco Co.
Winston-Salem, North Carolina 27102 (USA)

RIDEAL, Sir E.K., Prof. emeritus
Royal College of Sciences, Department of Chemistry
Imperial Institute Road, London SW 7 (UK)

SHELUDKO, A., Prof.
Bulgarian Academy of Sciences
Sofia (Bulgaria)

I.7 Joint Commission: Applied Radioactivity
Commission mixte: Radioactivité appliquée

Chairman

IUPAC SELIGMAN, H., Dr.
 1959-1967 International Atomic Energy Agency
 Kärntnerring, Vienna (Austria)

Secretary

IUPAC FISHER, C.,
 1959-1967 Commissariat à l'Energie Atomique
 Centre d'Etudes Nucléaires de Saclay
 Boîte Postale n° 2, Gif-sur-Yvette (S.-et-O.) (France)

Members

IUPAP ALLISY, A.,
 Bureau international des Poids et Mesures
 Pavillon de Breteuil, Sèvres (S.-et-O.) (France)

IUBS CALVIN, M., Dr.
 Department of Chemistry, University of California
 Berkeley (USA)

IUPAP ELLIOTT, L. G., Dr.
 Atomic Energy of Canada Ltd.
 Chalk River, Ont. (Canada)

IUPS KEYNES, R. D., Dr.
 Agricultural Research Council, Institute of Animal Physiology
 at Babraham, Cambridge (UK)

IUPAC PEREY, M., Mlle, Prof.
 1959-1967 Centre de Recherches Nucléaires
 rue du Loess, Strasbourg-Cronenbourg (B.-Rh.) (France)

IUGG PICCIOTTO, E., Dr.
 Université Libre, 50, av. F.-D.-Roosevelt, Bruxelles 5 (Belgium)

IUBS REICHARD, G. B.
 Medicinsk-Kemiska Inst. Karolinska Institutet,
 Solnavägen 1, Stockholm 60 (Sweden)

IUB USSING, H. H., Prof.
 Institute of Biological Chemistry, University of Copenhagen
 2 A Øster Farimagsgade, Copenhagen K (Denmark)

Representative assistant

H. KAMEN, Prof.
 University of California, La Jolla, Cal. (USA)

**JOINT ICSU COMMISSION ON SPECTROSCOPY:
IUPAC MEMBERS**

- 1968-1971 LORD, R.C., Prof.
Spectroscopy Laboratory,
Massachusetts Institute of Technology
Cambridge, Mass. (USA)
- THOMPSON, H.W., Prof.
St. John's College
Oxford (UK)
- 1968-1974 FASSEL, V., Prof.
Iowa State University
Ames, Iowa (USA)
- JONES, R.N., Dr
Division of Pure Chemistry
National Research Council of Canada
Ottawa (Canada)

INORGANIC CHEMISTRY DIVISION
DIVISION DE CHIMIE MINÉRALE

Division Committee / Comité de Division

Titular Members

President

- 1967-1969 BÉNARD, J., Prof.
Ecole nationale supérieure de Chimie
11, rue Pierre-Curie, Paris 5^e (France)

Past-President

- 1967-1971 DE BOER, J.H., Prof.
Scientific Council for Nuclear Affairs
Duinweg 24, P.O.B. 5086, The Hague (Netherlands)

Vice-President

- 1967-1969 GLEMSER, O., Prof.
Institut für Anorganische Chemie, Universität Göttingen
Hospitalstrasse 8-9, 34 Göttingen (Germany)

Secretary

- 1965-1969 COLLONGUES, R., Prof.
Centre d'Etudes de Chimie métallurgique
15, rue Georges-Urbain, Vitry-sur-Seine (France)

Members

- 1967-1971 GUTMANN, V., Prof.
Technische Hochschule
Getreidemarkt 9, Vienna VI (Austria)
- 1967-1971 JENSEN, K. A., Prof.
Kemisk Lab. II, H. C. Ørsted Inst.
Universitetsparken 5, Copenhagen Ø (Denmark)
- 1967-1971 NYHOLM, Sir R. S., Prof.
University College London, Department of Chemistry
Gower Street, London WC 1 (UK)
- 1965-1969 SARTORI, G., Prof.
Istituto di Chimica generale e inorganica, Università di Roma
Città Universitaria, Roma (Italy)
- 1967-1971 SPACU, P., Prof.
Anorganisch-Chemisches Institut der Universität Bukarest
Splaiul Independentei 89, Bucharest (Rumania)
- 1967-1971 WICHERS, E., Prof. Dr
9601 Kingston Road, Kensington, Md, 20795 (USA)

II.1 Commission: Atomic Weights
Commission: Poids atomiques

Titular Members

Chairman

1967-1971 WICHERS, E., Prof. Dr.
9601 Kingston Road, Kensington, Md, 20795 (USA)

Secretary

1967-1969 GUÉRON, J., Prof.
EURATOM
51-53, rue Belliard, Brussels 5 (Belgium)

Members

1967-1971 FUJIWARA, S., Prof.
Chemistry Department, Faculty of Science, Tokyo University
Hongo Tokyo (Japan)

1967-1971 GREENWOOD, N. N., Prof.
Dept of Chemistry
University of Newcastle-on-Tyne
Newcastle-on-Tyne (UK)

1967-1971 PEISER, H. S., Dr
National Bureau of Standards
Washington, DC (USA)

1967-1971 SPAEPEN, J., Dr
EURATOM Bureau of Nuclear Measurements
51-53, rue Belliard, Brussels 5 (Belgium)

1967-1971 THODE, H. G., Prof.
McMaster University
Hamilton, Ont. (Canada)

1967-1971 WAPSTRA, A. H., Prof.
Institut voor Kernenergie Onderzoek
Oosterringdyk 18, Amsterdam (Netherlands)

Associate Members

CAMERON, A. E., Dr
Oak Ridge National Laboratory
P.O.B. Y, Oak Ridge, Tenn. (USA)

FLEROV, G. N., Prof.
Joint Institute for Nuclear Research
Dubna, Moscow (USSR)

ROTH, E., Prof.
Commissariat à l'Energie Atomique
Saclay
BP 2, Gif-sur-Yvette (France)

SVEC, H. J., Dr
Institute for Atomic Research and Department of Chemistry
Iowa State University
Ames, Iowa 50012 (USA)

Titular Members*Chairman*

- 1959-1969 JENSEN, K. A., Prof.
Kemisk Lab. II, H. C. Ørsted Inst.
Universitetsparken 5, Copenhagen Ø (Denmark)

Vice-Chairman

- 1959-1969 REMY, H., Prof.
Oberstrasse 60, Hamburg 13 (Germany) and
Chemisches Staatsinstitut
Jungiusstrasse 7-9, D-2 Hamburg 36 (Germany)

Secretaries

- 1959-1969 GALLAIS, F., Prof.
Centre National de la Recherche scientifique
15, quai Anatole-France, Paris 7^e (France)
- 1963-1969 PRUE, J. E., Dr
Department of Chemistry, The University of Reading
Reading, Berks. (UK)

Members

- 1967-1971 ADAMS, R. A., Prof.
Geneva College
Beaver Falls, Pa (USA)
- 1963-1969 CHATT, J., Prof., F.R.S.
The Chemical Lab., University of Sussex
Falmer, Brighton (UK)
- 1959-1969 CHEESMAN, G. H., Dr
Chemistry Department, University of Tasmania
G.P.O. Box 647, Hobart, Tasmania (Australia)
- 1963-1969 FERNELIUS, W. C., Dr
Research Center, Koppers Co. Inc.
440 College Park Drive, Monroeville, Pa, 15146 (USA)
- 1953-1969 MALATESTA, L., Prof.
Istituto di Chimica generale dell'Università
Via Saldini 50, Milano (Italy)
- 1959-1969 ÖLANDER, A., Prof.
University of Stockholm
Kungstensgatan 45, Stockholm VA (Sweden)

Associate Members

- BÉNARD, J., Prof.
Ecole nationale supérieure de Chimie
11, rue Pierre-Curie, Paris 5^e (France)
- FEITKNECHT, W., Prof.
Chemisches Institut der Universität
Freiestrasse 3, 3012 Berne (Switzerland)

KOTOWSKI, A., Dr
Gmelin-Institut
Postschliessfach 13369, D-6 Frankfurt/Main W.13 (Germany)
REES, A.L.G., Dr
CSIRO Chemical Research Laboratories
Box 4331 G.P.O., Melbourne (Australia)

Corresponding Members

YAMASAKI, K., Prof.
Chemical Institute, Faculty of Science, Nagoya University
Chikusa, Nagoya (Japan)

Observer III.1

VEIBEL, S., Prof.
Department of Organic Chemistry
Technical University of Denmark
Lyngby (Denmark)

II.3

Commission: High Temperatures and Refractories

Commission: Hautes Températures et Réfractaires

Titular Members

Chairman

19...-1969 NOWOTNY, H., Prof.
Physikalisch-Chemisches Institut der Universität Wien
Währingerstrasse 42, Vienna IX (Austria)

Secretary

1965-1969 COLLONGUES, R., Prof.
Centre d'Etudes de Chimie métallurgique
15, rue Georges-Urbain, Vitry-sur-Seine (France)

Members

1965-1969 FLOOD, H., Prof.
Inst. of Silicate Science, Norwegian Institute of Technology
Trondheim (Norway)

1965-1969 HORTON, W.S., Dr, National Bureau of Standards
Washington 25, DC, 20234 (USA)

Associate Members

BRIGHT, N.F.H., Dr
Department of Mines and Technical Surveys
555, Booth Street, Ottawa (Canada)

CABANNES, F., Prof.
Laboratoire des Echanges thermiques
1, place Aristide-Briand, Bellevue (S.-et-O.) (France)

SCHAEFER, H., Prof.
Anorganisch-Chemisches Institut der Universität Münster
Hindenburgplatz 55, Münster (Germany)

WALKER, R.F., Dr
National Bureau of Standards
Washington 25, DC, 20234 (USA)

Division Committee / Comité de Division**Titular Members***President*

- 1967-1969 BARTLETT, P.D., Prof.
288, Concord Road, Weston 93, Mass. (USA)

Past-President

- 1967-1969 WEYGAND, F., Prof.
Org.-chem. Inst., Techn. Hochschule
Arcisstrasse 21, 8 München 2 (Germany)

Vice-President

- 1967-1969 BARTON, D.H.R., Prof., F.R.S.
Department of Chemistry, Imperial College of Science
Imperial Institute Road, London SW 7 (UK)

Secretary

- 1965-1969 OURISSON, G., Prof.
Institut de Chimie, Esplanade, 67 Strasbourg (France)

Members

- 1965-1969 HEROUT, V., Prof.
Institute of Organic Chemistry and Biochemistry
Flemings Square 2, Prague 6 (Czechoslovakia)
- 1961-1969 KJAER, A., Prof.
Department of Organic Chemistry
Den Kgl. Veterinaer- og Landbohøjskole
Bülowsvej 13, Copenhagen V (Denmark)
- 1961-1969 NAKANISHI, K., Prof.
Department of Chemistry, Tohoku University
Katahira-cho, Sendai (Japan)
- 1967-1971 SHEMAKIN, M. M., Acad.
Institute for the Chemistry of Natural Products
Academy of Sciences of the USSR
1-i Akademicheskii Prospekt 18, Moscow B-312 (USSR)
- 1967-1971 YATES, P., Prof.
Department of Organic Chemistry, University of Toronto
Toronto, Ont. (Canada)
- 1965-1969 ZOLLINGER, H., Prof.
Techn.-chem. Laboratorium, Eidg. Techn. Hochschule
8006 Zürich (Switzerland)

III.1 Commission: Nomenclature of Organic Chemistry
Commission: Nomenclature de Chimie organique

Titular Members

Library
American Chemical Society

Chairman

- 19...-1971 VERKADE, P.E., Prof.
Ary Schefferstraat 217, The Hague (Netherlands)

Secretary

- 1967-1971 NUTTING, H.S., Dr
1608 Crane Court
Midland, Mich. 48640 (USA)

Members

- 1965-1969 CROSS, L.C., Dr, Editor
The Chemical Society
Burlington House, Piccadilly, London W 1 (UK)
- 1967-1971 DYSON, G.M., Dr
49 Forest Road, Loughborough, Leicestershire (UK)
- 1965-1969 LOENING, K.L., Dr
Chemical Abstracts Service, The Ohio State University
Box 1378, Columbus, Ohio, 43210 (USA)
- 1967-1971 LOZAC'H, N., Prof.
Doyen de la Faculté des Sciences, Nouvelle Université
14-Caen (Calv.) (France)
- 1967-1971 VEIBEL, S., Prof.
Organisk Kemisk Laboratorium, Polyteknisk Laereastalt
Bygning 201, Lyngby (Denmark)

Associate Members

- CAHN, R.S., Dr
23 Woodwaye, Oxhay, Watford, Herts. (UK)
- KLESNEY, S.P.
566 Bldg., The Dow Chemical Co.
Midland, Mich., 48640 (USA)

III.2 Joint Commission: Biochemical Nomenclature
Commission mixte: Nomenclature biochimique

Chairman

- IUB HOFFMANN-OSTENHOF, O., Prof.
 Organisch-Chemisches Institut der Universität
 Währinger Strasse 38, 1090 Wien (Austria)

Secretary

- IUPAC COHN, W., E., Dr
 1965-1969 Biology Division
 Oak Ridge National Laboratory, P.O. Box Y, Oak Ridge,
 Tenn. 31830 (USA)

Members

- IUB BRAUNSTEIN, A. E., Prof.
 Institute of Molecular Biology, Academy of Sciences of the USSR
 Vavilov St. 18, Moscow (USSR)
- IUB FRUTON, J. S., Prof.
 Yale University, Sterling Hall of Medicine
 350 Kline Biology Tower, 219 Prospect St.
 New Haven, Conn. 06520 (USA)
- IUPAC KARLSON, P., Prof.
 1967-1971 Institut für Physiologische Chemie
 D-355 Marburg/Lahn (Germany)
- IUPAC KEIL, B., Dr
 1967-1971 Czechoslovak Academy of Sciences, Institute of Organic
 Chemistry and Biochemistry
 Flemingova 2, Prague 6 (Czechoslovakia)
- IUPAC KLYNE, W., Prof.
 1965-1969 Chemistry Department, Westfield College
 Hampstead, London NW 3 (UK)
- IUB LIÉBECQ, C., Prof.
 Laboratoire de Biochimie
 1, rue des Bonnes-Villes, Liège (Belgium)
- IUB SLATER, E. C., Prof.
 B.C.P. Jansen Institute
 Plantage Muidergracht 12
 Amsterdam C (Netherlands)
- IUPAC WEBB, E. C., Prof.
 1967-1971 Dept of Biochemistry
 University of Queensland
 St. Lucia, Qld 4067 (Australia)

Corresponding Member

TAMIYA, N., Prof.
 Chemistry Dept. Tohoku University
 Katanivacht, Sendai (Japan)

MACROMOLECULAR DIVISION
DIVISION DE CHIMIE MACROMOLÉCULAIRE

Division Committee / Comité de Division

Titular Members

(as established on 11 November 1967)

President

WICHTERLE, O., Prof.
 Institute of Macromolecular Chemistry
 Petřiny, Prague 6 (Czechoslovakia)

Vice-President

BENOIT, H., Dr
 CRM, 6, rue Boussingault, Strasbourg 67 (France)

Secretary

SMETS, G., Prof.
 Laboratory of Macromolecular Chemistry
 Université de Louvain, 96, rue de Namur, Louvain (Belgium)

Members

BARRETT, J. W.
 Monsanto Chemicals, Monsanto House
 10 Victoria Street, London SW 1

BAWN, C. E. H., Prof. C.B.E.
 Department of Chemistry, University of Liverpool
 Liverpool (UK)

HORN, O., Prof. Dr
 Farbwerke Hoechst AG
 D-623 Frankfurt/Main-Höchst (Germany)

MEDVEDEV, S. S., Prof.
 Academy of Sciences, Leninskii Prospekt 14
 Moscow V-71 (USSR)

OKAMURA, S., Prof.
 Kyoto University, Kyoto (Japan)

OVERBERGER, C. G., Prof.
 Department of Chemistry, University of Michigan
 Ann Arbor, Mich., 48104 (USA)

SCHULZ, G. V., Prof.
 Institute of Physical Chemistry, University of Mainz
 Jakob-Belder-Weg 15, Mainz (Germany)

(3 vacancies to be filled)

Associate Members

BUECHE, A. M., Dr
 General Electric Company
 P.O.B. 1088, Schenectady, New York (USA)

CAIRNS, R. W., Dr, Vice-President
Hercules Incorporated
Wilmington, Del., 19899 (USA)

KARGIN, V. A., Prof.
Academy of Sciences, Institute of Chemical Physics
Vorobjevskoje Chaussée 2b, Moscow V-334 (USSR)

LETORT, M., Prof.
35, rue St-Dominique, Paris 7^e (France)

MELVILLE, Sir HARRY, K.C.B., F.R.S.
Principal Queen Mary College
Mile End Road, London E 1 (UK)

NATTA, G., Dr
Istituto di Chimica Industriale del Politecnico
Via Mario Pagano 54, Milano (Italy)

SAKURADA, I., Prof.
Institute for the Chemistry of Cellulose
Sakyoku, University of Kyoto, Kyoto (Japan)

ANALYTICAL CHEMISTRY DIVISION
DIVISION DE CHIMIE ANALYTIQUE

Division Committee / Comité de Division

Titular Members

President

- 1965-1969 WEST, P.W., Prof.
Chemistry Department, Louisiana State University
Baton Rouge, La, 70803 (USA)

Vice-President

- 1967-1969 KEMULA, W., Prof.
Warsaw University, Department of Chemistry,
ul. Pasteura 1, Warsaw 22 (Poland)

Secretary

- 1967-1971 FENNELL, R.W.
Materials Department, Royal Aircraft Establishment
Farnborough, Hants (UK)

Members

- 1967-1971 ALIMARIN, I. P., Prof.
V. I. Vernadsky Institute of Geochemistry and Analytical
Chemistry
Vorobievskoye Chaussée 47a, Moscow V-334 (USSR)
- 1967-1971 BELCHER, R., Prof.
Department of Chemistry, University of Birmingham
P.O.B. 363, Birmingham 15 (UK)
- 1967-1971 DUVAL, C., Prof.
Laboratory for Microchemical Research
10, rue Pierre-Curie, Paris (France)
- 1967-1971 ERDEY, L., Prof.
Institut für allgemeine Chemie der technischen Universität
Gellert ter 4, Budapest XI. (Hungary)
- 1965-1969 FUJINAGA, T., Prof.
Department of Chemistry, Faculty of Science
Kyoto University, Kyoto (Japan)
- 1965-1969 HUME, D.N., Prof.
Department of Chemistry, Massachusetts Institute of Technology
Cambridge, Mass., 02139 (USA)
- 1965-1969 KAISER, H., Prof.
Institut für Spektrochemie und angewandte Spektroskopie
Bunsen-Kirchhoff-Strasse, 46 Dortmund (Germany)
- 1967-1971 MALISSA, H., Prof.
Institut für Analytische Chemie und Mikrochemie
Technische Hochschule
Getreidemarkt 9, Vienna VI (Austria)
(Pres. Commission V.1)

Commission:**Techniques microchimiques et de l'analyse des traces****Titular Members***Chairman*

- 1965-1969 SCHÖNIGER, W., Dr
Microlab., Pharm.-chem. Department
Sandoz Limited, CH-4002 Basel 13 (Switzerland)

Secretary

- 1965-1969 LÉVY, R., Dr
Service central de Microanalyse du CNRS
2, rue H.-Dunant, 94 Thiais (France)

Members

- 1965-1969 FLASCHKA, D.H., Prof.
Georgia Institute of Technology, Department of Chemistry
Atlanta, Ga (USA)
- 1965-1969 GEL'MAN, N.E., Dr
Institute of Elemental Organic Compounds, Academy of Science
14 Vavilov Street, Moscow (USSR)
- 1967-1971 KOCH, O.D., Dr
Neunkircher Eisenwerk AG, Chemisches Laboratorium
Goethestrasse 45, D-668 Neunkirchen-Saar (Germany)
- 1965-1969 KOCH, W., Prof.
August-Thyssen-Hütte AG
D-41 Duisburg-Hamborn, Postfach 67 (Germany)
- 1965-1969 STEYERMARK, A., Dr
Microchemical Department, Hoffmann-La Roche Inc.
Roche Park, Nutley 10, N.J. (USA)
- 1965-1969 VEČEŘA, M., Prof., Director
Institute of Chemical Technology
Pardubice (Czechoslovakia)

Associate Members

- CHENG, K.L., Prof.
Department of Chemistry, University of Missouri
Kansas City, Mo., 64110 (USA)
- KÖRBL, J., Ing.
Research Institute of Pharmacy and Biochemistry
Kouřimská 17, Prague 12 (Czechoslovakia)
- MACDONALD, A.M.G., Dr
Chemistry Department, University of Birmingham, Edgbaston
P.O.B. 363, Birmingham 15 (UK)
- MALISSA, H., Prof.
Institut für Analytische Chemie und Mikrochemie
Technische Hochschule
Getreidemarkt 9, Vienna VI (Austria)

V.3 Commission: Analytical Nomenclature
Commission: Nomenclature analytique

Titular Members

Chairman

- 1963-1969 BELCHER, R., Prof.
Chemistry, Department University of Birmingham, Edgbaston,
P.O.B. 363, Birmingham 15 (UK)

Secretary

- 1965-1969 WEST, T.S., Prof.
Chemistry Department, Imperial College, South Kensington
London SW 7 (UK)

Members

- 1967-1969 ALIMARIN, I. P., Prof.
V.I. Vernadsky Institute of Geochemistry and Analytical
Chemistry
Vorobievskoye chaussée 47a, Moscow V-334 (USSR)
- 1961-1969 BAYER, E., Prof.
Chemisches Institut der Universität
Wilhelmstrasse 33, Tübingen (Germany)
- 1965-1969 FISCHER, W., Prof.
Anorganisch-chemisches Institut
Callinstrasse 46, Hannover (Germany)
- 1965-1969 IRVING, H. M. N. H., Prof.
Chemistry Department, The University of Leeds
Leeds 2, Yorks (UK)
- 1967-1971 SAMUELSON, O., Prof.
Chalmers Institute of Technology,
Gibraltargatan 5 A, Gothenburg (Sweden)
- 1961-1969 SANDELL, E. B., Prof.
School of Chemistry, University of Minnesota
Minneapolis 14, Minn. (USA)

Associate Members

- AMBROSE, D., Dr
National Physical Laboratory
Teddington, Middlesex (UK)
- BERG, E., Dr
Chemistry Department, Louisiana State University
Bâton Rouge, La, 70803 (USA)
- BIEMANN, K., Dr
Chemistry Department
M.I.T., Cambridge 39, Mass., 02139 (USA)
- LASTOVSKY, R. P., Prof.
All Union Institute of Chemical Reagents
Bogorodsky Val 3, Moscow (USSR)

MENIS, O., Dr
Department of Coordination Chemistry
National Bureau of Standards
Gaithersburg, Washington, DC, 20234 (USA)

STAHL, E., Prof.
Institut für Pharmakognosie, Universität Saarbrücken
D-66 Saarbrücken (Germany)

STEPHEN, W.I., Dr
Chemistry Department, University of Birmingham, PO.Box 363
Birmingham 15 (UK)

ZETTLER, H., Dr
Norddeutsche Raffinerie
D-2 Hamburg (Germany)

Commission:**Spectrochemical and other Optical Procedures for Analyses****Commission:****Spectroanalyse et autres méthodes optiques d'analyse****Titular Members***Chairman*

- 1965-1969 KAISER, H., Prof.
Institut für Spektrochemie und angewandte Spektroskopie
Bunsen-Kirchhoff-Strasse, 46 Dortmund (Germany)

Secretary

- 1965-1969 FASSEL, V. A., Prof.
Department of Chemistry, Iowa State University
Ames, Ia, 50010 (USA)

Members

- 1967-1971 ALKEMADE, C.T.J., Prof.
Physical Laboratory of the University
Utrecht (Netherlands)
- 1967-1971 BIRKS, L.S.,
U.S. Naval Research Laboratory
Washington 25, DC (USA)
- 1967-1971 KVALHEIM, A.,
Chemistry Division, Norges Geologiske Undersøkelse
Leiv Eirikssons Vei 39, Trondheim (Norway)
- 1967-1971 PLŠKO, E., C.Sc.
Hanacka ul. 4, Bratislava (Czechoslovakia)
- 1961-1969 SCRIBNER, B. F.,
Spectrochemistry Division, National Bureau of Standards
Washington, DC, 20234 (USA)

Associate Members

- BILLS, K. M., Dr
International Nickel Limited
Wiggin Street, Birmingham 16 (UK)
- DEVRIES, J. L., Dr
N. V. Philips Gloeilampenfabrieken
B. I. T. Applications Laboratory
Eindhoven (Netherlands)
- GUYER, H., Dr
Dätwyler A.G.,
6460 Altdorf/Uri (Switzerland)
- MENZIES, A. C., Dr
Hilger and Watts Ltd.
98 St. Pancras Way, Camden Road, London NW 1 (UK)
- ROBIN, J. P., Dr
Institut national des Sciences appliquées (INSA)
Chimie industrielle
20, av. A.-Einstein, 69 Villeurbanne (France)

RUBEŠKA, I., Dr
Ústředni ústav geologický
Kostelni 26, Praha 7 (Czechoslovakia)

SALPETER, E. W., Dr
Laboratorio astrofisico, Specola Vaticana
Città del Vaticano (Italy)

STRASHEIM, A., Dr
National Physical Laboratory
P.O.B. 395, Pretoria (South Africa)

V.5 Commission: Electroanalytical Chemistry
Commission: Chimie électro-analytique

Titular Members

Chairman

- 1967-1969 KOLTHOFF, I.M., Prof.
School of Chemistry, University of Minnesota
Minneapolis, Minn., 55455 (USA)

Secretary

- 1967-1971 ZUMAN, P., Dr
Department of Chemistry, University of Birmingham
P.O.B. 363, Birmingham 15 (UK)

Members

- 1965-1969 CHARLOT, G., Prof.
10, rue Vauquelin, Paris 5^e (France)
- 1967-1971 KEMULA, W., Prof.
Chemistry Department, Warsaw University
ul. Pasteura 1, Warsaw 22 (Poland)
- 1967-1971 MEITES, L., Prof.
Department of Chemistry, Brooklyn Polytechnic Institute
Brooklyn 1, New York, 11201 (USA)
- 1967-1971 PERRIN, D.D., Dr
Department of Medical Chemistry, The John Curtin School of
Medical Research, The Australian National University
Canberra, A.C.T. (Australia)
- 1965-1969 TANAKA, N., Prof.
Department of Chemistry, Tohoku University
Sendai (Japan)

Associate Members

BISHOP, E.

University of Exeter, Department of Chemistry
Stocker Road, Exeter (UK)

BRUCKENSTEIN, S., Prof.

School of Chemistry, University of Minnesota
Minneapolis, Minn., 55455 (USA)

COETZEE J.F., Dr

Department of Chemistry, University of Pittsburgh
Pittsburgh 13, Penn. (USA)

GALUS, Z., Dr

Department of Inorganic Chemistry, Warsaw University
ul. Pasteura 1, Warsaw 22 (Poland)

NURNBERG, H., Dr

Kernforschungsanlage
D-517 Jülich (Germany)

ROBINSON, R.A., Prof.
National Bureau of Standards
Washington, DC, 20234 (USA)

TREMILLON, S., Dr
18, rue Berthollet, Paris 15^e (France)

National Representatives

FUJINAGA, T., Prof.
Department of Chemistry, Faculty of Science, Kyoto University
Kyoto (Japan)

STRADINŠ, J., Dr
Institute of Organic Chemistry, Academy of Science
Riga, Latvian SSR (USSR)

Observer

BADOZ-LAMBLING, J., Mrs., Dr
Faculté des Sciences de Paris
Laboratoire de Chimie Analytique, EPCI
10, rue Vauquelin, Paris 5^e (France)

Titular Members*Chairman*

- 1967-1971 MARCUS, Y., Prof.
Department of Inorganic and Analytical Chemistry
Hebrew University of Jerusalem
Jerusalem (Israel)

Secretary

- 1965-1969 ROSSOTTI, F.J.C., Dr
Inorganic Chemical Laboratory
South Parks Road, Oxford (UK)

Members

- 1967-1971 ANDEREGG, G., Dr
Institut für Anorganische Chemie, ETH
Universitätsstrasse 6, 8006 Zürich (Switzerland)
- 1965-1969 BECK, M.T., Dr
Institute of Inorganic and Analytical Chemistry
University of Szeged
P.O.B. 440, Szeged (Hungary)
- 1965-1969 BIEDERMANN, G., Prof.
Department of Inorganic Chemistry, KTH
Stockholm 70 (Sweden)
- 1965-1969 LEUSSING, D.L., Prof.
Department of Chemistry, Ohio State University
Columbus, Ohio (USA)
- 1967-1969 ROGERS, L.B., Prof.
Purdue University
Lafayette, Ind. (USA)
- 1965-1969 YAMASAKI, K., Prof.
Department of Chemistry, Nagoya University
Chikusa, Nagoya (Japan)

Associate Members

- BRUCKENSTEIN, S., Prof.
School of Chemistry, University of Minnesota
Minneapolis, Minn., 55455 (USA)
- DYRSSEN, D., Prof.
Department of Analytical Chemistry, University of Gothenburg
Gibraltargatan 5a, Gothenburg S (Sweden)
- FREISER, H., Prof.
Department of Chemistry, University of Arizona
Tucson, Ariz., 85721 (USA)
- HUME, D.N., Prof.,
Department of Chemistry, Massachusetts Institute of Technology
Cambridge, Mass., 02139 (USA)

KERTES, A.S., Dr
Department of Inorganic and Analytical Chemistry
Hebrew University of Jerusalem
Jerusalem (Israel)

MARTELL, A.E., Prof.
Department of Chemistry, Texas A and M University
College Station, Texas (USA)

SILLEN, L.G., Prof.
Department of Inorganic Chemistry, Royal Institute of Technology (KTH)
Stockholm 70 (Sweden)

YATZIMIRSKII, K.B., Prof.
Institute of General and Inorganic Chemistry of the
Ukrainian Academy of Sciences
ul. Leontovicha 9a, Kiev (USSR)

V.7 Commission: Analytical Radiochemistry and Nuclear Materials

Commission: Radiochimie et Matériaux nucléaires

Titular Members

Chairman

- 1965-1969 COOK, G. B., Dr.
International Atomic Energy Agency
Kärtnerring 11, Vienna I (Austria)

Secretary

- 1965-1969 MEINKE, W. W., Dr
National Bureau of Standards, Chemistry Division
Washington, DC, 20234 (USA)

Members

- 1965-1969 CRESPI, M. B. A., Dr
Comisión Nacional de Energia Atomica
Avenida del Libertador, 8250, Buenos Aires (Argentina)
- 1965-1969 MINCZEWSKI, J., Prof.
Technical University of Warsaw
Dorodna 16, Warsaw (Poland)
- 1965-1969 SMALES, A. A., Dr
Atomic Energy Research Establishment
Harwell, Didcot, Berks. (UK)

Associate Members

HECHT, F., Prof.
University of Vienna
Währinger Strasse 38, Vienna 9 (Austria)

KOSTA, L., Prof.
J. Stefan Institute of Nuclear Sciences
Ljubljana (Yugoslavia)

PLATZER, J., Dr
Centre d'Etudes nucléaires
Département de Chimie analytique
BP 6, Fontenay-aux-Roses, Seine (France)

WAINERDI, R., Dr
Activation Analysis Laboratory, Texas A and M College
College Station, Texas (USA)

APPLIED CHEMISTRY DIVISION
DIVISION DE CHIMIE APPLIQUÉE

Division Committee / Comité de Division

Titular Members

President

GALLAY, W., Dr
 The E.B. Eddy Co.
 Hull, P.Q. (Canada)

Vice-President

TRUHAUT, R., Prof.
 Université de Paris, Faculté de Pharmacie, Chaire de Toxicologie
 4, avenue de l'Observatoire, Paris 6^e (France)

Secretary

PUDDINGTON, I. E., Dr
 Division of Applied Chemistry, National Research Council
 of Canada
 Ottawa, Ontario (Canada)

Elected Members

CAIRNS, R. W.
 Vice-President, Hercules Incorporated
 Wilmington, Delaware, 19899 (USA)

* CONNOR, R., Dr
 The Rohm & Haas Building, Independence Mall West
 Philadelphia, Pa, 19105 (USA)

HOSHINO, K., Dr
 Toyo Rayon Co.
 Tokio (Japan)

SHABAD, L., Prof.
 Institut d'Oncologie de Moscou
 Moscou (USSR)

STOLL, W. G., Dr
 Firma J. R. Geigy AG, Basel (Switzerland)

(2 vacancies to be filled)

* Was elected by the Division and confirmed by the Bureau and Council, but in view of his commitments in preparing the IUPAC Congress, will not be able to serve

Ex officio Members

1965-1969 BOEKENOOGEN, H. A., Prof.
 "Het Boekelaer", Overasebaan 5, Rijsbergen (N. Br.)
 (Netherlands)

1967-1969 FINK-JENSEN, P. H.
 A/S Sadolin & Holmblad
 Holmbladsgade 70, Copenhagen S (Denmark)

- 1967-1971 FRAZER, A. C., Prof.
British Nutrition Foundation, Alembic House
93 Albert Embarkment, London SE 1 (UK)
- 1967-1971 FREYSCHUSS, S. T., Dr
Sweden
- 1967-1969 GALLEY, R. A. E., Dr
Shell Research Ltd, Woodstock Agricultural Research Centre
Sittingbourne, Kent (UK)
- 1965-1969 HURTIG, H., Dr
Canada Department of Agriculture
Research Branch, Central Experimental Farm
Ottawa (Canada)
- 1965-1969 SUOMALAINEN, H., Dr
The Finnish State Alcohol Monopoly
Alko, Box 10350, Helsinki 10 (Finland)
- 1967-1971 TRUHAUT, R., Prof.
Faculté de Pharmacie, Université de Paris
4, avenue de l'Observatoire, Paris 6^e (France)
- 1967-1971 WARD, Jr., K., Dr
The Institute of Paper Chemistry
P.O.B. 1048, Appleton, Wisc. (USA)

VI.8 Section: Water, etc.
Section: Eau, etc.

Dr FREYSCHUSS will be the President
(New members to be appointed)

VI.1**Section: Food****Section: Bromatologie****Titular Members***Chairman*

- 1967-1971 FRAZER, A.C., Prof.
British Nutrition Foundation, Alembic House
93 Albert Embarkment, London SE 1 (UK)

Secretary

- 1961-1969 FRANCOIS, A., Prof.
Institut national de la Recherche agronomique
Domaine de Vilvert, Jouy-en-Josas (S.-et-O.) (France)

Members

- 1964-1969 BIGWOOD, E.J., Prof.
Centre for European Studies, University of Brussels
48, rue Emile-Bouilliot, Brussels (Belgium)
- 1961-1969 BUSHILL, J.H., Dr
"Solara", Bonavita Street, Sliema, Malta (GC)
- 1964-1969 FISCHBACH, Henry, Dr, Director
Division of Food, Bureau of Scientific Research
Food and Drug Administration
Washington 25, DC (USA)
- 1969-1971 MARCUSE, R., Prof.
Swedish Institute for Food
Preservation Research, Kalleback, Goteborg (Sweden)
- 1961-1969 SOUCL, S.W., Prof. Dr
Deutsche Forschungsanstalt für Lebensmittelchemie
Leopoldstrasse 175, D-8 München 23 (Germany)
- 1961-1969 TRUHAUT, R., Prof.
Université de Paris, Faculté de Pharmacie
4, av. de l'Observatoire, Paris 6^e (France)

Associate Members

- EGAN, H., Dr
Laboratory of the Government Chemist
Cornwall House, Stamford Street, London SE 1 (UK)
- OSER, B.L., Dr
Food and Drug Research Laboratories Inc.
Maurice Avenue at 58th Street, Maspeth 78, New York,
NY, 11378 (USA)

VI.1.1 Commission: Trace Substances
Commission: Substances existant à l'état de trace

Titular Members

Chairman

1964-1969 FISCHBACH, H., Dr, Director
Division of Food, Bureau of Scientific Research
Food and Drug Administration
Washington 25, DC (USA)

Members

1967-1971 CUTTING, C. L., Dr
Meat Research Institute, University of Bristol
Langford (UK)

1964-1969 DIKUN, P. P., Prof.
Oncological Institute of the Academy of Medical Sciences of USSR
Leningrad (USSR)

1967-1971 JONES, N. R., Dr
Tropical Products Institute
56/62 Grays Inn Road, London WC 1 (UK)

1964-1969 TILGNER, D. J., Prof. Dr
Department of Animal Products Technology
Politechnika Gdansk, Gdansk 6 (Poland)

1967-1971 URITANI, I., Prof.
Laboratory of Biochemistry, Nagoya University
Chikusa, Nagoya (Japan)

1967-1971 WASSERMAN, A. E., Dr
Eastern Utilization Research Division
Agricultural Research Division
US Department of Agriculture
600 E. Mermaid Lane, Wendmoor, Pa., 19118 (USA)

1964-1969 WOGAN, G. N., Dr
Department of Food Technology
Massachusetts Institute of Technology
Cambridge, Mass. (USA)

Associate Members

CAMPBELL, A. D., Dr, Chief
Contaminants Branch, Division of Food Chemistry
Bureau of Science, Food and Drug Administration
200 C St. S.W.
Washington, DC, 20204 (USA)

DALGAARD-MIKKELSEN, S., Dr
Royal Veterinary College
Copenhagen (Denmark)

EGAN, H., Dr
Laboratory of the Government Chemist
Cornwall House, Stamford Street, London SE 1 (UK)

LONGH, H. de, Dr
Unilever Research Laboratory
Deltaweg 160, Vlaardingen (Netherlands)

MILER, K. B. M., Dr
Instytut Przemysłu Mięsnego
Head Division of Meat Chemistry
Rakowiecka 36 (Poland), Warszawa 12

PURCHASE, I. F. N., Dr
Division of Toxicology, NNRI of the CSIR
P.O.B. 395, Pretoria (South Africa)

VI.1.2 Commission: Food Additives
Commission: Additifs alimentaires

Titular Members

Chairman

1967-1971 BUSHILL, J. H., Dr
"Solara", Bonavista Street, Sliema, Malta (GC)

Members

1967-1971 FRANCOIS, A., Prof.
Institut national de la Recherche agronomique
Domaine de Vilvert, Jouy-en-Josas (S.-et-O.) (France)

1967-1969 FRAZER, A. C., Prof.
British Nutrition Foundation, Alembic House
93 Albert Embarkment, London SE 1 (UK)

1967-1971 MARCUSE, R., Prof.
Swedish Institute for Food Preservation Research
Kalleback (Sweden)

1967-1969 SOUCL, S. W., Prof. Dr
Deutsche Forschungsanstalt für Lebensmittelchemie
Leopoldstrasse 175, D-8 München 23 (Germany)

1965-1969 SOUTO, A. B., Dr
Instituto Adolfo Lutz, Laboratório de Saúde pública
Avenida Dr Arnaldo 3, São Paulo (Brazil)

1967-1969 TRUHAUT, R., Prof.
Université de Paris, Faculté de Pharmacie
4, av. de l'Observatoire, Paris 6^e (France)

Associate Members

COLLINGS, A. J., Dr
Watson-Marlow Ltd.
Marlow, Bucks (UK)

KOJIMA, K., Dr
Environmental Sanitation Bureau
Ministry of Health and Welfare
Japanese Gort
1/2-Chome, Kasumifaseki, Chiyoda-Ku, Tokyo (Japan)

OSER, B.L., Dr.
Food and Drug Research Laboratories Inc.
Maurice Avenue at 58th Street, Maspeth 78, New York, NY
11378 (USA)

REITH, J.F., Prof.
Department of Food Chemistry and Toxicology
University of Utrecht
Utrecht (Netherlands)

VI.1.3 Sub-Commission: Mycotoxins
Sous-Commission: Mycotoxines

Titular Members

Secretary

CAMPBELL, A.D., Dr, Chief
Contaminants Branch, Division of Food Chemistry
Bureau of Science, Food and Drug Administration
200 C St. SW, Washington, DC, 20204 (USA)

Member

JONES, N.R., Dr
Tropical Products Institute
56/62 Gray's Inn Road, London WC 1 (UK)

Associate Members

EGAN, H., Dr
Supt. Food, Drugs and Agriculture Division
Government Chemist, Cornwall House
Stamford Street, London SE 1 (UK)

PURCHASE, I.F.H., Dr
Division of Toxicology, NNRI of CSIR
P.O.B. 395, Pretoria (South Africa)

URITANI, I., Prof.
Nagoya University, Chikusa, Nagoya (Japan)

VI.1.4 Sub-Commission: Smoke Constituents
Sous-Commission: Constituants Fumés

Titular Member

WASSERMAN, A.E., Dr
Eastern Utilization Research Division
Agricultural Research Division, US Department of Agriculture
600 E. Mermaid Lane, Wendmoor, Pennsylvania, 19118 (USA)

Associate Member

CUTTING, C.L., Dr
A.R.C. Meat Research Institute
University of Bristol, Langford (UK)

VI.2 Section: Fermentation Industries

Section: Fermentation

Titular Members

Chairman

- 1965-1969 SUOMALAINEN, H., Dr
The Finnish State Alcohol Monopoly
Alko, Box 10350, Helsinki 10 (Finland)

Vice-Chairman

- 1965-1969 LANGLYKKE, A. F., Dr
The Squibb Institute for Medical Research
New Brunswick, NY 08903 (USA)

Secretary

- 1965-1969 PARISI, F., Dr
Eridania Zuccherifici Nazionali, Laboratorio Ricerche
Via Trento, 96, 20099 Sesto S. Giovanni (Italy)

Members

- 1965-1969 ARIMA, K., Prof.
Department of Agricultural Chemistry, The University of Tokyo
Bunkyo-ku, Tokyo (Japan)
- 1967-1971 FIECHTER, A., Dr
Eidgenössische Technische Hochschule
Mikrobiologisches Institut
Weinbergstrasse 38, CH-8006 Zürich (Switzerland)
- 1967-1971 HOCKENHULL, D. J. D., Dr
Glaxo Laboratories Ltd.
Greenford, Middlesex (UK)
- 1967-1971 HOOGERHEIDE, J. C., Dr
Koninklijke Nederlandsche Gist- en Spiritusfabriek NV
Delft (The Netherlands)
- 1967-1971 PIRT, S. J., Prof.
Queen Elizabeth College, Microbiology Department
Campden Hill, London W 8 (UK)

Associate Members

- BUNKER, H. J., Mr
17 Radnor Road, Twickenham, Middlesex (UK)
- DREWS, B., Prof.
Institut für Gärungsgewerbe
Seestrasse 13, D-1 Berlin 65 (Germany)

- LIGHT, R. F., Dr
Standard Brands Inc., 625 Madison Ave.
New York 22, NY (USA)

LUNDIN, H., Prof.
Division of Food Chemistry, Royal Institute of Technology
Valhallavägen 79, Stockholm 70 (Sweden)

MALÉK, I., Academician
Czechoslovak Academy of Sciences
KRČ, Budějovická 1083, Prague 4 (Czechoslovakia)

PEPPLER, H. J., Universal Foods Corporation
P.O.B. 737, Milwaukee, Wisc., 53201 (USA)

VI.3 **Section: Oils and Fats**
 Section: Matières grasses

Titular Members

Chairman

1965-1969 BOEKENOOGEN, H. A., Prof.
"Het Boekelaer", Overasebaan 5, Rijsbergen (N. Br.)
(Netherlands)

Vice-President

1965-1969 BERTRAND, J. E.
134, av. Eugène-Demolder, Bruxelles 3 (Belgium)

Secretary

1963-1969 VOS, H. J.
Populierenlaan 1a, Bosch en Duin
Post Bilthoven (Netherlands)

Members

1965-1969 BOSSHARD, A., Dr
Plüss-Stauffer AG
4665 Oftringen (Switzerland)

1965-1969 HEINZ, H. J., Dr
Henkel & Cie. GmbH
Postfach 1100, D-4 Düsseldorf (Germany)

1965-1969 MALENIČKY, M., Ing.
Severoceské Tukové Závody, Karla IV 305, Usti nad Labem
(Czechoslovakia)

1965-1969 PAQUOT, C., Prof.
Laboratoire de Lipochimie
Groupe des Laboratoires du CNRS de Vitry-Thiais
Rue Henri-Dunant, 94 Thiais (France)

1965-1969 RUTKOWSKI, A., Prof.
Instytut Chemii Ogólnej
ul. Rydygiera 8, Warsaw 86-Zoliborz (Poland)

Associate Members

NAUDET, M., Prof. Dr
Laboratoire de Chimie des Corps gras, Faculté des Sciences
Place Victor Hugo, 148, rue Edmond-Rostand
Marseille 8^e (France)

CORNELIUS, J. A., Dr
Tropical Products Institute
56/62 Gray's Inn Road, London WC 1 (UK)

RAYMOND, W. D., Dr
«Solana», Russel Avenue, Swanage, Dors. (UK)

National Representatives

- Argentina CATTANEO, P., Prof. Dr
Instituto Argentino de Racionalización de Materiales
Calle Chile n° 1192, Buenos Aires
- LOEW, G., Dr
Via Mascarella 77/3, Bologna (Italy)
- Austria CZEDIK-EYSENBERG, P. B., Dr
Ketzergrasse 471, 1230 Wien, Rodaun
- GORBACH, G., Prof. Dr
Technische Hochschule
Schlögelgasse 9, Graz
- SCHMID, L., Prof. Dr
Lehrkanzel für Lebensmittelchemie an der Universität Wien
Währinger Strasse 38, Wien IX
- Belgium BERTRAND, J. E.
134, avenue Eugène-Demolder, Brussels 3
- DELVAUX, E. L., Prof. Dr
27, avenue Léon-Darte, Heverlee-Leuven
- LONCIN, M., Prof. Dr Dr Ing.
CERIA (Centre d'Enseignements et de Recherches
des Industries Alimentaires et Chimiques)
1, avenue E.-Gryson, Brussels 7
- Czechoslovakia MALENIČKY, M., Ing.
Severoceské Tukové Závody
Karla IV 305, Usti nad Labem
- POKORNY, J., Dr
Institute of Chemical Technology
Department of Food Chemistry and Analysis
Technická čp 1905, Praha 6, Dejvice
- Denmark ERBBOE, J.
Aarhus Oliefabrik A/S, Aarhus
ou: 8 Stenhøjsvej, Viby (J)
- LINTZ-CHRISTENSEN, S. B.
Dansk Sojakagefabrik A/S
24 Islands Brugge, København
- PETERSEN, A.
A/S C. E. Bast's Talgsmelteri
Ingerslevsgade 44, København V

- France DESNUELLE, P., Prof. Dr
Faculté des Sciences
Place Victor-Hugo, Marseille
- PAQUOT, C., Prof. Dr
Laboratoire de Lipochimie du CNRS
(Centre national de la Recherche scientifique)
Rue Henri-Dunant, 94 Thiais
- WOLFF, J. P.
Laboratoires Wolff
180, Faubourg St-Denis, Paris (10)
- Germany HEINERTH, E., Dr Ing.
Analytisches Laboratorium der Firma Henkel & Cie.
D-4 Düsseldorf 1, Postfach 1100
- HEINZ, H. J., Dr
Henkel & Cie. GmbH
D-4 Düsseldorf 1, Postfach 1100
- WENDT, H. R. H., Dr
Margarine-Union GmbH
Friedensallee 333, D-2 Hamburg-Bahrenfeld
- Ireland BREADEN, T. W.
McCormack & Co. Ltd, Soap and Chemical Manufacturers
West Pier, Dun Laoghaire (Co. Dublin)
- DAVIDSON, V. E.
Clover Meats Ltd, Waterford
- HALPIN, G. G.
The Irish Oil and Cake Mills Ltd
Marsh Road, Drogheda (Co. Louth)
- Italy BALESTRINI, G., Dr
Via Tamburini 12, Milano
- JACINI, G., Prof. Dr
Stazione sperimentale per le Industrie degli Olii e dei Grassi
Via G. Colombo 79, Milano
- MONACELLI, R.
Istituto Superiore di Sanità
Viale Regina Elena 299, Roma
- Netherlands BOEKENOOGEN, H. A., Prof. Dr
"Het Boekelaer"
Overasebaan 5, Rijsbergen (N. Br.)
- HOEKE, F., Dr
Keuringsdienst van Waren
Baan 74, Rotterdam 1
- Vos, H. J., Dr
Populierenlaan 1a, Bosch en Duin (post Bilthoven)
- Poland GRYNBERG, H., Mme, Dr
Instytut Chemii Ogólnej
ul. Rydygiera 8, Warsaw 86-Zoliborz
- NIEWIADOMSKI, H., Prof. Dr
Politechnika Gdanska, Gdansk-Wrzeszcz
ou: Marska 2 m8, Sopot

- RUTKOWSKI, A., Prof. Dr
Instytut Chemii Ogólnej
ul. Rydygiera 8, Warsaw 86-Zoliborz
- Spain GRACIAN-TOUS, J., Dr
Instituto de la Grasa y sus Derivados
Avenida Padre Garcia Tejero 4, Sevilla
- MARTINEZ-MORENO, J., Prof. Dr
Instituto de la Grasa y sus Derivados
Avenida Padre Garcia Tejero 4, Sevilla
- RANEDO, J.
Espalter 15, Madrid
- Sweden HELLSTEN, M., techn. lic.
Berol AB, Stenungsund
- OLIN, E., Ing.
AB Karlshamns Oljefabriker, Karlshamn
- WODE, G., Dr
Margarinbolaget AB, Nyängsvägen 155, Bromma
- Switzerland BOSSHARD, A., Dr
Plüss-Stauffer AG
CH-4665 Oftringen
- BRÜSCHWEILER, H., Dr
Eidg. Materialprüfungs- und Versuchsanstalt (EMPA)
Unterstrasse 11, CH-9001 St. Gallen
- KLEINERT, J., Dr
Lindt & Sprüngli AG
CH-8802 Kilchberg ZH
- United Kingdom ELSA LEWKOWITSCH, P. R., Mme, Dr
71 Priory Road, West Hampstead, London NW 6
- LEE, W. V.
The British Oil and Cake Mills Ltd
Albion Wharf, Erith, Kent
- WILLIAMS, K. A., Dr
161 Roseberry Avenue, London EC 1
- USA EMBREE, N. D., Dr, Vice President
Technical Operations, Distillation Products Industries
Rochester 3, N. Y.
- SALLEE, E. M., Dr
The Procter & Gamble Co.
Ivorydale Technical Center, Cincinnati 17, Ohio
- SNELL, F. D., Dr
29 West 15th Street, New York 11, N. Y.

VI.4 Section: Toxicology and Industrial Hygiene
Section: Toxicologie et Hygiène industrielle

Titular Members

Chairman

- 1967-1971 TRUHAUT, R., Prof.
Faculté de Pharmacie, Université de Paris
4, avenue de l'Observatoire, Paris 6^e (France)

Secretary

- 1967-1969 BOUDÈNE, C., Prof.
Faculté de Pharmacie, Université de Paris
4, avenue de l'Observatoire, Paris 6^e (France)

Members

- 1967-1971 FREDRICK, W., Dr
Director Bureau of Industrial Hygiene
City of Detroit, Dept. of Health
8801 John C. Lodge, Detroit, Mich. 48202 (USA)
- 1967-1971 LUXON, S.G.
Industrial Hygiene Laboratory
Ministry of Labour, 1-13 Chepstow Place
Westbourne Grove, London W 2 (UK)
- 1965-1969 METRICO, L., Dr
Laboratorio Igiene industriale Montecatini
Via S. Barnaba 8, Milano (Italy)
- 1967-1971 PILZ, W., Dr
Farbenfabriken Bayer AG
Leverkusen (Germany)
- 1965-1969 VASAK, V., Dr
Institute of Industrial Hygiene
Srobarova 48, Prague-Vinohrady (Czechoslovakia)

Associate Members

BROSSEF, C., Dr
Technical University of Gothenburg (Sweden)

BUSTUEVA, C., Dr
Institute of Graduate Medical Training
c/o USSR Ministry of Health
Rakhmanovski per 3, Moscow (USSR)

GAGE, J.C., Dr
Industrial Hygiene Research Laboratories
Imperial Chemical Industries Ltd.
Alderley Park, Macclesfield, Ches. (UK)

KEENAN, R.G., Prof.
Public Health Service
1014 Broadway, Cincinnati 2, Ohio (USA)

PIETRULLA, W., Dr
Wissenschaftsrat beim Bundesgesundheitsamt
Institut für Wasser-, Boden- und Lufthygiene
Laboratorium für chemische Toxikologie
Postfach, D-1 Berlin 33 (Germany)

WEST, P. W., Prof.
Boyd Professor of Chemistry, College of Chemistry and Physics
Bâton Rouge 3, La (USA)

VI.5 Section: Pesticides
Section: Pesticides

Titular Members

Chairman

1965–1969 HURTIG, H., Dr
Canada Department of Agriculture, Research Branch
Central Experimental Farm, Ottawa (Canada)

Secretary

1965–1969 RESNICK, CH., Dr
Plant Protection Department
Ministry of Agriculture
P.O.B. 15030, Jaffa (Israel)

Members

1965–1969 COOK, J. W., Dr
Division of Food Chemistry, Food and Drug Administration
Washington, DC, 20204 (USA)

1967–1971 FREHSE, H., Dr
Farbenfabrik Bayer AG, Biologisches Institut
D-509 Leverkusen-Bayerwerk (Germany)

1967–1969 GALLEY, R. A. E., Dr
Shell Research Ltd
Sittingbourne, Kent (UK)

1967–1971 SUTHERLAND, G., Dr
Director Development and Registrations
Agricultural Division, American Cyanamid Co.
P.O.B. 400, Princeton, N.J. (USA)

1967–1971 TRUHAUT, R., Prof.
Faculté de Pharmacie, Université de Paris
4, avenue de l'Observatoire, Paris 6^e (France)

1967–1971 WIDMARK, G., Prof.
Institute of Analytical Chemistry, University of Stockholm
Roslagsvagen 90, Stockholm (Sweden)

**VI.5.1 Commission: Terminal Pesticide Residues
(Development, Improvement and Standardization
of Methods of Pesticide Residue Analysis)
Commission: Résidus Terminaux Pesticides**

Chairman

1965-1969 HURTIG, H., Dr
Canada Department of Agriculture
Research Branch, Central Experimental Farm
Ottawa (Canada)

Secretary

Members

1965-1969 COOK, J. W., Dr
Division of Food Chemistry, Food and Drug Administration
Washington, DC, 20204 (USA)

1967-1969 GALLEY, R. A. E., Dr
Shell Research Ltd, Woodstock Agricultural Research Centre
Sittingbourne, Kent (UK)

1967-1971 SUTHERLAND, G. L., Dr
American Cyanamid Company
P.O.B. 400, Princeton, N.J. 08540 (USA)

Associate Members

KENAGA, E. E.
Dow Chemical Company
Midland, Mich., 48641 (USA)

MOORE, J. B., Dr
McLaughlin, Gormley, King 6, 1715 SE Fifth Street
Minneapolis, Minn., 55414 (USA)

POLEN, P., Dr
Velsicol Chemical Corp.
330 E. Grand Avenue, Chicago, Ill., 60611 (USA)

PORTER, P. E., Dr
Shell Development Company
P.O.B. 3011, Modesto, Calif., 95353 (USA)

SPENCER, E. Y., Dr
Research Institute, Canada Department of Agriculture
University P.Q., London, Ont. (Canada)

VI.5.2 Commission: Pesticide Residue Analysis

Titular Members

Chairman

- 1967-1969 GALLEY, R. A. E., Dr
Shell Research Ltd, Woodstock Agricultural Research Centre
Sittingbourne, Kent (UK)

Secretary

Members

- 1965-1969 COOK, J. W., Dr
Division of Food Chemistry, Food and Drug Administration
Washington, DC, 20204 (USA)
- 1967-1971 FREHSE, H., Dr
Biological Institute
D-509 Leverkusen-Bayerwerk (Germany)
- 1965-1969 HURTIG, H., Dr
Research Branch, Canada Department of Agriculture
Ottawa, Ont. (Canada)
- 1965-1969 RESNICK, C., Dr
Pesticides Division, Ministry of Agriculture
P.O.B. 15030, Jaffa (Israel)
- 1967-1971 WIDMARK, G., Dr
Institute of Analytical Chemistry, University of Stockholm
Roslagsvagen 90, Stockholm 50 (Sweden)

Associate Members

- BROWN, W. B.
Pest Infestation Laboratory
London Road, Slough, Bucks (UK)
- ELGAR, K. E.
Shell Research Ltd, Woodstock Agricultural Research Centre
Sittingbourne, Kent (UK)
- KOIVISTOINEN, P. E., Dr
University of Helsinki
Helsinki 71 (Finland)
- McCULLY, K. A., Dr
Food and Drug Directorate, Tunney's Pasture
Ottawa, Ont. (Canada)

Titular Members*Chairman*

- 1967-1969 FINK-JENSEN, P.H.
A/S Sadolin & Holmblad
Holmbladsgade 70, Copenhagen S (Denmark)

Secretary

- 1967-1969 RAASCHOU-NIELSEN, H.K.
Danish Paint and Ink Research Laboratory
Odensegade 14, Copenhagen O (Denmark)

Members

- 1967-1971 GLASER, M.A.
Midland Industrial Finishes Co., Inc.
1-7 East Water St., Waukegan, Ill., 60085 (USA)
- 1967-1971 HAMANN, K., Prof., Dr
Forschungsinstitut für Pigmente und Lacke
Wiederholdstrasse 10, 7 Stuttgart N (Germany)
- 1967-1971 LAAR, J.A.W., van Dr
Philips' Gloeilampenfabrieken NV
Chem. Lab. App. SL 4
Eindhoven (Netherlands)
- 1965-1969 O'NEILL L.A., Dr
Paint Research Station
Waldegrave Road, Teddington, Middlesex (UK)
- 1967-1969 OESTERLE, K.M., Dr
Goldbacherstrasse 88, CH-8700 Küsnacht ZH (Switzerland)
- 1967-1971 PAGANI, D., Prof. Dr
Istituto di Chimica, Industriale del Politecnico
Piazza Leonardo da Vinci 32, Milano (Italy)

Associate Members

- BULT, R., Dr
Verfinstituut T.N.O.
Postbus 203, Delft (Netherlands)
- CAILLIEZ, A.
Laboratoire, IPV
Av. Pierre-Holoffe, Limette-Rofessart (Belgium)
- HOCHWEBER, M., Dr
Eidgenössische Materialprüfungs- und Versuchsanstalt
Überlandstrasse 129, CH-8600 Dübendorf (Switzerland)
- WAPLER, D., Dr
Bundesanstalt für Materialprüfung
Unter den Eichen 87, Berlin-Dahlem (Germany)

National Representatives

Belgium	OOSTENS, E. 48, avenue Jean-de-Bologne, Brussels 2
Canada	BECKWITH, N. W., Dr 85 W. Wyandotte Street, Windsor, Ont.
France	PETIT, J., Dr Centre national de la Recherche scientifique rue H.-Dunant, Thiais (Seine)
Netherlands	TALLEN, H. W., Dr Roelofstraat 124, The Hague
Sweden	HEMBERG, B. Svenska Färgindustrins Forskningslaboratorium Drottning Kristinas Väg 45, Stockholm O

VI.7 Section: Pulp, Paper and Board

Section: Pâte, Papier et Carton

Titular Members

Chairman

- 1967-1971 WARD, Jr., K., Dr
The Institute of Paper Chemistry
P.O.B. 1048, Appleton, Wisc. (USA)

Vice-Chairman

ANKER-RASCH, O., Director
Papirindustriens Forskningsinstitut
P.O.B. 250, Vinderen, Oslo 3 (Norway)

Secretary

- 1967-1971 SANKEY, C. A., Dr
The Ontario Paper Co. Ltd
Thorold, Ont. (Canada)

Members

- 1967-1971 CENTOLA, G., Prof.
Stazione Sperimentale Cellulose e Carta
Piazza Leonardo da Vinci 26, Milano (Italy)
- 1967-1971 HAVRÁNEK, J., Dr
Paper and Pulp Research Institute
Lamačská 5, Bratislava IX (Czechoslovakia)
- 1967-1971 PRIOR, M.
Deputy Director, PIRA, St. Winifreds
Welcomes Road, Kenley, Surrey (UK)
- 1965-1969 ROGOVIN, Z. A., Prof.
Textile Research Institute of Moscow
Moscow (USSR)
- 1967-1971 RUTISHAUSER, M., Dr
Cellulosefabrik Attisholz AG
CH-4708 Luterbach (Switzerland)

Associate Members

COHEN, W. E., Dr
10 Keltie Street, Burwood, E. 13, Victoria (Australia)

MIGITA, N., Prof.
Faculty of Agriculture, University of Tokyo
Bunkyo-ku, Tokyo (Japan)

MONZIE, P., Dr, Chief
Department of Cellulose, Faculté des Sciences
Université de Bordeaux
Bordeaux (France)

NORIN, T., Prof.
Central Laboratory Swedish Cellulose Industry
Drottning Kristanasväg 61, Stockholm (Sweden)

PALENIUS, I.
Finnish Pulp and Paper Research Institute
Helsinki (Finland)

REPORT OF THE PRESIDENT ON THE STATE OF THE UNION

IUPAC Conference 1967

At the Council-Meeting in Paris in 1965, the following problems were singled out as especially urgent for the further development of the Union:

1. To improve the financial situation
2. To appoint adequate staff for the Secretariat
3. To obtain a legal status of the Union
4. To strengthen the inner structure of the Union and to coordinate its efforts to aid the development of science and technology
5. To promote cooperation with other and especially governmental organizations

I would like to give the following report on our progress in dealing with these problems:

1. Finance

As you remember, the preliminary budget—presented in Paris—showed a considerable deficit for 1966 and a very large one for 1967—so large that the reserves of the Union would have been used up to a great extent. The report of the Honorary Treasurer demonstrates that it was possible to achieve a surplus for 1966 and that in 1967 the deficit will presumably remain within reasonable limits. The fact that matters have developed better than we had expected is the result of some measures discussed in detail in the Report of the Honorary Treasurer. But that should not lead us to the fallacious hope that everything is now financially in order. Our Secretary's Office must be expanded according to long existing plans (see part 2). Our Commissions must be able to work without imposing financial sacrifices on the members in a manner that will enable them to complete their tasks without delay or other hindrance due to lack of funds. We cannot expect that the willingness of some countries to give voluntary donations will continue indefinitely.

An increase of our income might be achieved by the transfer of some countries to a higher category. I would like to express our sincere thanks to our Canadian colleagues, that Canada has applied for a higher category and I hope that some other member countries which are not yet in a category corresponding to their importance will follow this example.

Furthermore I am convinced that the decision of the Bureau and the Executive Committee to invite chemical companies to become "Company Associates" of IUPAC will open up new sources of steady revenue. The success of this scheme will depend on whether we can stimulate a greater interest in IUPAC matters on the part of industry. At the meeting of the Bureau in Frankfurt—based on memoranda submitted by Profs KONDRATIEV and LECOMTE—this question was discussed. A possible way would be to elect representatives from industry into Division Committees and Commissions to a much greater extent than has hitherto been the case. Also, the suggestion to build "independent sections" on matters of industrial interest, which will be discussed under 4, could have a similar effect. Finally, a report on the more important achievements of the Union is in preparation. This report will serve as a supplement to the pamphlet on IUPAC published a few years ago, and will be used for publicity purposes.

2. The Secretariat of IUPAC

As you all know, the Secretariat of the Union has been under the direction of Dr R. MORF for the past 11 years. In every report of the presidents on the state of the Union, the great services rendered by Dr RUDOLF MORF have been pointed out; the satisfactory development of the Union during the last decade would not have been possible without the enthusiastic devotion of Dr MORF to his work in the interest of the Union. It has certainly given great pleasure to the Union and indeed to all chemists, that both the Gesellschaft Deutscher Chemiker and the American Chemical Society, have awarded Dr MORF a scroll, in which his services for the Union are honoured.

Nevertheless all who have closer knowledge of the work of the Secretariat, are convinced that one cannot expect one person to perform indefinitely the vast amount of work it entails. Dr MORF has not only been "Honorary Secretary General" all these years, but has also been *de facto* our executive secretary. During the last two years, this situation has become particularly difficult for a variety of reasons. Because of the untimely death of Dr DEGENS, who had done outstanding work for the Union, the Union Secretariat had to take over the secretarial duties of the Division of Analytical Chemistry. On top of all this as the result of cooperation with the Communauté Economique Européenne, extensive new tasks devolved for the Secretariat.

We must, therefore, strengthen the Union Secretariat as a matter of extreme urgency. Above all, we need an Executive Secretary to assist the Secretary General, so that he can confine himself to the overall direction of the office in his capacity as Honorary Secretary General. It is not easy to find a suitable person for the position of Executive Secretary and our efforts to fill the post have so far been in vain. We are now negotiating with several gentlemen however and I hope to be able to inform you in Prague that we have an Executive Secretary.

As soon as we have found an Executive Secretary, we shall be able to implement the suggestions of Lord TODD (CR XX, p.91), to introduce the Secretary General's Office more strongly into the work of the Divisions and Commissions, and to let all correspondence go through this office, so that a complete file is available in at least one place. A start in this direction has already been made with the Divisions for Inorganic and for Analytical Chemistry.

3. Legal Status of the Union

One question of great importance for the work of IUPAC is the legal status of the Union. As long as IUPAC has no juridical status, serious problems can arise. For instance, the officers of an organization which has no juridical status, become responsible to the extent of their entire personal fortune for losses which are not covered by the reserves of the Union. Furthermore, the grant of tax exemption depends upon the country in which the headquarter of the Union is registered. Accordingly, the IUPAC Finance Committee, with a view to strengthening the financial position of IUPAC and rationalizing the position of its officers, proposed that the headquarter of IUPAC be transferred to Switzerland in 1967, as it appears that there is in that country a favourable tax situation for IUPAC. The report of the Finance Committee was accepted by Council (CR XXIII, p.129) and referred to the Bureau and Executive Committee for detailed consideration.

The Executive Committee has carefully investigated this question and has concluded that the transfer of the headquarter of the Union to Switzerland --preferably to Zürich--and the registration with a Swiss Cantonal

Government provide the most favourable conditions. Therefore, the Executive Committee at its meeting in Zürich 11/12 July 1966 unanimously decided that a preliminary request for juridical status be filed with the Regierungsrat des Kantons Zürich, Switzerland, under the proviso that, according to § 4.3 of the Statutes, the application be ratified by the Council at its meeting in 1967.

4. The Internal Organization of IUPAC

According to § 2.2 of the Statutes it is one of the objects of IUPAC to study topics of international importance in pure and applied chemistry which need regulation, standardization or codification. This work is done by commissions, created by the Council on the recommendation of a Division Committee. According to § 41301/2 of the by-laws: "the terms of reference of a Commission shall be clearly described". Every second year the Bureau and Council shall, in the light of the Division President's report, "decide whether or not to continue a commission". It seems to me that in the past these rules have not been carefully enough observed. At the Council Meeting in Prague we must follow them rigorously, not only in order to meet the requirements of the statutes, but also because the financial situation of the IUPAC makes it necessary. The Division Committees have a great responsibility in this matter. Some of the Commissions clearly correspond to the definition of § 41301, but in the case of others, one is not always sure. In order to bring their organization into harmony with the by-laws, to achieve greater efficiency, and to save money, each Division Committee should consider thoroughly the following questions: Which Commissions are necessary for long-term work (e.g. nomenclature, symbols and units)? Which Commissions must be given a certain (but restricted!) time to finish their work? Which Commissions should be dissolved at the Council Meeting?

There are Commissions whose main purpose appears to be the organization of Symposia. This is, without a doubt, a useful and necessary activity, but one does not need a Commission (with 8 titular members!) for this purpose. Under certain circumstances the Division Committee could take over this task; if specially important subfields are involved, one could form a *Section* for which—in my opinion—three Titular Members would be sufficient. Such sections can assist the Division Committee in supervising a special branch of the Division's field, it can organize symposia and it can give advice if the creation of a Commission for a special term seems necessary.

The Divisions of our Union correspond to the classical organization of chemistry: physical, inorganic, organic, etc. It becomes increasingly apparent, that especially important developments in science and technology lie between these classical disciplines. In the past IUPAC has perhaps not always paid enough attention to this development. In any case, a series of international organizations have been formed which represent borderlines but, which strictly speaking operate within the IUPAC field of activity. Examples are: electrochemistry, catalysis, coordination chemistry, biochemistry, geochemistry, clinical chemistry, detergents, chemical engineering. Many of these organizations are very strong and there seems little hope that they will become parts of IUPAC. To counteract this splitting up of scientific activity, the formation of *associated* organizations (§ 11 of the Statutes) should be promoted. But whatever else happens, one should strive to keep questions of nomenclature, standards and symbols in the IUPAC to make sure that the basic system is everywhere the same. The cooperation with IUPAP concerning atomic weight and with IUB concerning nomenclature, are excellent examples showing that cooperation is possible with good will on both sides.

Special attention should be paid to the fact that our Union is not only responsible for pure but also for applied chemistry. Our Division for Applied Chemistry is very active, but it comprises only a small part of applied chemistry. Many fields which are very important in chemical industry, are not adequately represented in IUPAC. Therefore we should look for a new approach. High Polymers are a good example. They have become extremely important in the chemical industry during the past few decades. IUPAC has a Commission on Macromolecules in the Physical Chemistry Division and a Section on Plastics and High Polymers in the Applied Chemistry Division. In order to emphasize the importance of this field in IUPAC, to rationalize our activities one should unite these two organizations and create something new: either a Division for High Polymers or some kind of independent section, which would work in a manner similar to a Division. Thereby, not only would theory and practice be united, but the interest of this field to all classical disciplines of chemistry would be emphasized. Industry would certainly welcome a demonstration that IUPAC has a real interest in such an important field! There are further examples of industrially significant topics in which IUPAC should bring together specialists by the formation of "Independent Sections"; possibilities are drugs (natural and synthetic) and their medical application, petrochemistry, pigments, organic dyes, metallurgy. One should act quickly however before new independent splinter organizations are formed in these fields. One would thereby gain for IUPAC a reputation in industry similar to that which it now possesses in pure science.

5. Cooperation with Governmental Organizations

In recent years it has been emphasized again and again that IUPAC should cooperate closely with Governmental Organizations, such as UNESCO, ISO, WHO, insofar as chemical questions are concerned. A close cooperation in this direction has been in existence for some time between UNESCO and our Committee on Teaching of Chemistry. This committee under the direction of Prof. NYHOLM has completed its first report; the cooperation with UNESCO suffers it is true from the fact that the funds set aside by UNESCO for this purpose are too small. But I have the impression that important persons in UNESCO would like very much to improve this cooperation.

A new activity is developing in our cooperation with the Communauté Economique Européenne (CEE) on the analytical determination of food additives. The first steps in establishing cooperation between IUPAC and CEE were taken up in 1964, by Prof. R. TRUHAUT and by the Secretary General. The work done here will also be useful to FAO in working out the corresponding chapters of the Codex Alimentarius. Cooperation with CEE presents a difficult problem for IUPAC, as the necessary machinery for consultation must first be built up. Here, too, an increase in the personnel of the Union Secretariat is necessary—but it is very difficult to find suitable persons. However, I believe we owe it to the reputation of IUPAC to make every effort to carry through this large and difficult undertaking to a successful conclusion.

At the conclusion of my report I would like to mention one matter, which causes me great concern. Our commissions have worked out rules for nomenclature, symbols, etc. with great enthusiasm and great professional knowledge. These efforts however will achieve their aim only if they are put into use. The results which have been achieved so far are not satisfactory. In my field, inorganic chemistry, I notice again and again that in journals, monographs, etc. the rules laid down as long as ten years ago, are only

slowly gaining acceptance. Many conclusions of the Union are not generally known; e.g. the recommendation of the Council (CR Montreal 1961, p.122) to use the symbols A and G (instead of F) for free energy appears to be unknown to many specialists in this field. We really must consider carefully whether we cannot find better ways to publicize such recommendations and further the use of the new nomenclature and symbols.

Further details of the past two years I shall mention only briefly in this report: The Congress in Moscow, which our colleagues organized under the direction of Prof. KONDRATIEV was very successful. Numerous small congresses and symposia, which IUPAC has sponsored, have taken place. A very agreeable cooperation developed with our colleagues in Prague, especially with Prof. ŠORM, Prof. ČUTA, Prof. WICHTERLE and Dr PETŘÍK in the preparation of the Conference and the Congress of 1967. The cooperation with ICSU—which was very successfully directed by our colleague THOMPSON during the past two years—functioned smoothly. Very significant for chemistry are the efforts of ICSU on the improvement of documentation and of ICSU/UNESCO on information. The development of the IUPAC Journal will be described by Prof. THOMPSON in a special report. We have to thank him, Prof. WEEDON and Dr CULLIS for their efforts in the interest of our Journal.

At this time, I would like to thank all those who have supported me during the past two years, the Division, Section and Commission Presidents, the members of the Bureau and of the Executive Committee and above all the officers of the Union. Prof. BAILAR has devoted a great deal of his time and energy to ensure that the financial affairs of the Union remain in good shape. He has had excellent support from the Union Bank of Switzerland (G. HANSELMANN and Dr J. RAKOWSKI) and the Finance Committee under the chairmanship of M. ARNOLD. The outstanding services of Dr MORF on behalf of the Union have already been mentioned in this report; may I once again thank him most heartily and include in my thanks all the coworkers of the Secretariat. I obtained special help and much personal advice from the Past-President, Lord TODD. His interest in the Union, his clear judgment, his practical sense for that which could be achieved, were a very valuable support; his friendship was a great personal gain for me. We regret very much that Lord TODD now resigns; he has done much for which we have to thank him.

My last task as President is, to hand on my office to Prof. KONDRATIEV. We all know Prof. KONDRATIEV as an outstanding scientist with a clever mind, with clear perception for the problems of the Union, and as a good comrade. I am convinced that the Union will develop well under the presidency of Prof. KONDRATIEV; many things, which are now in their early stages, will come to full bloom during the next two years. For me, as the Past-President, it will be an honour and a pleasure to help the new President in word and deed.

KLEMM

BIENNIAL REPORT OF THE TREASURER FOR 1965/66

1. INTRODUCTION

During the past decade, the scientific program of IUPAC has grown rapidly, and it must continue to grow if the Union is to fulfill its responsibility as the arbiter of international chemical standards and the leading organization in international chemical affairs. There are many opportunities for IUPAC to serve, and if it does not respond, governmental or private organizations will assume the responsibilities. There are two dangers here. First, most of these organizations will not be fully international and so cannot hope that their decisions will be universally accepted. Second, many of these organizations will represent only specialized branches of chemistry, and their decisions may well be in conflict with those of organizations which represent distinct but related fields. The problems of international chemistry can be handled in a satisfactory way only by a truly international, voluntary organization representing all branches of chemistry. The International Union of Pure and Applied Chemistry is that organization.

2. INCOME

The income of IUPAC was slightly greater in 1966 than in 1965.

It can be expected that some of the items of increased income will continue at the 1966 level, or will increase, but others will not. Since the expenditures are sure to increase, it is essential that the Union find new sources of income. There is at present little relation between the chemical productivity of the several countries and the size of their contributions to IUPAC. It is dangerous to single out specific countries in a report of this sort, but the generosity of the Scandinavian countries and Switzerland deserves special commendation. The Finance Committee has discussed several plans of determining what each adhering body should pay if it is to be in line with others, but nothing definite has yet developed.

Formalization of the Company Associate plan has been much slower than we had hoped and, in the United States, which has the largest potential of any country, solicitation has not yet begun. The plan has already attracted some European companies, and we hope that many others will soon follow. We believe that the plan will not only increase the Union's income considerably, but that it will also bring it into closer contact with the chemical industry—a result which is much to be desired. The US National Committee is planning to hold a meeting each year to which Company Associates may send delegates (at company expense). Through these meetings, the industrial companies will be kept abreast of IUPAC activities, and will have an opportunity to discuss the work of the various IUPAC commissions.

The circulation of IUPAC's journal, "Pure and Applied Chemistry", remains disappointingly low, in spite of continued efforts by the publishers to gain new subscribers. It is difficult to see why this is so, for the journal is of excellent quality, and each issue contains articles of wide current interest. Subscriptions to the journal bring the Union some royalties each year, but by far the major portion of the royalties come from the sale of separates and reports.

3. EXPENSES

IUPAC relies to a great extent upon voluntary help, which often involves the expenditure of money by the volunteers, as well as the expenditure of time. Thus, the members of the Finance Committee (or their employers) have paid all of the expenses of that committee. The Australian member of the Executive Committee has been able to find funds to pay the expenses of his travel to the meetings of that committee. The four chemical companies in Basle have contributed generously to the Secretary-General's office for many years, and the employers of the other general officers of the Union have freely contributed office space and secretarial help. The Union Bank of Switzerland has been most generous and helpful in handling the accounts. We wish to express our thanks for all such help. Without it, IUPAC could not function.

Every effort is made to economize, but even so, expenses are heavy. International organizations necessarily have large travel budgets, and IUPAC is no exception, even though all travel is "economy class". Until 1963, titular members who attended meetings were reimbursed only to the extent of \$400, but this proved to be an unsatisfactory plan. Most members who lived at great distances from the meeting places could not afford to attend, so IUPAC could not operate as a truly international organization. Moreover, with limited attendance, the commissions could not work effectively. In the hope of increasing the attendance and accomplishing more work, the Council voted that starting with the London Conference in 1963, all titular members would receive full travel and subsistence expense. (In actuality, the subsistence allowance is not always sufficient to cover the cost to the member.) This has had the desired effect—attendance has improved remarkably (87% at the Paris Conference in 1965) and the commissions have operated more effectively. Unfortunately, it has also increased the cost by about 250 per cent and has thus produced an imbalance which we are struggling to correct. If income cannot be increased soon, it may be necessary to again limit the travel allowances of titular members.

The exact figures relating to the Income and Expenditure Account and the Balance Sheet can be seen in the report made by the Auditors, in the following pages.

JOHN C. BAILAR, JR.
Treasurer

*To the Executive Committee
International Union of Pure and Applied Chemistry
Basle—Switzerland*

AUDITORS' REPORT ON ACCOUNTS

Years ended 31 December 1965 and 1966

We have examined the balance sheets of International Union of Pure and Applied Chemistry as at 31 December 1965 and 1966 and the related statements of profit and loss for the two years then ended. Our examination was made in accordance with generally accepted auditing standards and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the enclosed balance sheets and the statements of profit and loss together with the return of supplementary information present fairly the financial position of the International Union of Pure and Applied Chemistry at 31 December 1965 and 1966 and the results of its operations for the two years then ended, in conformity with generally accepted accounting principles.

Neutra Auditing Inc.
(J. Lauber) (ppa. H. Heller)

COMPARATIVE BALANCE SHEETS

(Expressed in

Assets

	1965	1966
Cash in Banks	29 631.65	14 830.57
Bankers Acceptances (Commercial Bills)	42 000.—	91 000.—
Bullion Account	14 176.45	14 176.45
Marketable Securities—at cost (Market Value \$89391.—)	87 106.66	88 567.89
Other Assets	1 156.97	—.—

US-\$ 174 071.73 208 574.91

Note: Subscriptions outstanding as at

31 December 1966, aggregating US-\$ 4 450.— 6 150.—

COMPARATIVE STATEMENT OF INCOME AND EXPENDITURES

Income

(Expressed in

<i>Subscriptions</i>	1965	1966
Current year	82 349.12	85 522.09
Previous year	3 049.65	4 153.61
Voluntary contributions	18 400.— ¹	7 400.— ²
Voluntary contribution from Germany (special donation).	—.—	12 300.—
Associated companies	—.—	749.15
	103 798.77	110 124.85
<i>Interest and Dividends earned</i>	5 062.70	7 022.30
<i>Less: Transfer to reserve a/c</i>	5 062.70	7 022.30
	—.—	—.—
<i>Sales of Publications</i>	323.90	432.16
Royalties from Butterworth	10 298.50	13 991.89
<i>Less: Transfer to Reserve a/c</i>	—.— ³	10 000.—
	—.—	3 991.89
<i>Exchange Differences (net)</i>	—.—	101.—

Operating Loss for Period 26 203.83 —.—
140 625.— 114 649.90

UNESCO GRANTS ACCOUNT

Subventions collected
during the year 14 000.— 14 000.—
US-\$ 154 625.— US-\$ 128 649.90

¹ Donations in 1965: USA \$5000.— UK \$8400.— (£3000.—) Germany \$5000.—

² Donations in 1966: Germany \$5000.— Italy \$2400.—

³ In view of the operating loss it was impossible to transfer the statutory amount of \$10 000.— to Reserve

AS AT 31 DECEMBER 1965 AND 1966

US-Dollars)

Liabilities and net worth

	1965	1966
Accrued Liabilities	48 629.66	25 587.39
Net Worth:		
Capital Account	102 139.36	102 139.36
Reserve	49 506.54	61 172.87
	<u>151 645.90</u>	<u>163 312.23</u>
Less:		
Operating loss for the twelve months ended 31 December 1965	<u>26 203.83*</u>	125 442.07
Plus:		
Operating profit for the twelve months ended 31 December 1966		<u>19 675.29*</u>
	US-\$ <u>174 071.73</u>	US-\$ <u>182 987.52</u>
		<u>208 574.91</u>

* Total Operating loss for the biennium 1965/66 = US-\$6528.54

- YEARS ENDED 31 DECEMBER 1965 AND 1966

US-Dollars)

Expenditure

	1965	1966
Office Expenses		
Salaries, Printing, Stationery, Miscellaneous	37 821.63	33 097.70
Travel and Subsistence Allowances	23 299.22 ⁴	21 042.15 ⁴
Special Account (Paris and Moscow Meetings)	77 955.05	—.—
Contribution to Symposia	2 850.—	29 141 71
Publications	9 630.12	12 831.54
Total	<u>151 556.02</u>	<u>96 113.10</u>
Less: Subvention collected from UNESCO (Grants)	<u>14 000.—</u>	<u>14 000.—</u>
	137 556.02	82 113.10
Other Expenses		
Bank Charges	424.87	285.53
Subscription to ICSU	1 431.53	1 708.23
Taxes	—.— ⁵	—.— ⁵
Audit and Accounting charges	1 136.89	867.75
Voluntary contribution from Germany in favour of four Chemical Companies in Basle	—.—	10 000.—
	2 993.29	12 861.51
Exchange Differences (net)	75.69	—.—
Operating Profit for Period	<u>—.—</u>	<u>19 675.29</u>
	140 625.—	114 649.90
UNESCO GRANTS ACCOUNT		
Expenditures out of grants during the year	19 480.12	41 973.25
Less: IUPAC Funds, UNESCO a/c overdraft	<u>5 480.12</u>	<u>27 973.25</u>
	14 000.—	14 000.—
	US-\$ <u>154 625.—</u>	US-\$ <u>128 649.90</u>

⁴ Including overdraft of UNESCO - Teaching contract; Balance for the biennium 1965/66 \$1045.40

⁵ Not refundable Taxes withheld at source on Interest, Dividends and Royalties
1965 - \$2532.46
1966 - \$2689.45

INCOME OF IUPAC FROM NATIONAL ADHERING ORGANIZATIONS IN 1966

Contributions only

	\$		\$
Argentina	450	Luxembourg	450
Australia	2 600	Mexico	450
Austria	450	Netherlands	2 600
Belgium	2 600	New Zealand	450
Brazil	800	Nigeria	100
Bulgaria	450	Norway	800
Canada	2 600	Poland	800
China (Taiwan)	800	Portugal	450
Colombia	450	Republic of South Africa .	800
Cuba	100	Republic of Korea	450
Czechoslovakia	800	Republic of Vietnam . . .	450
Denmark	2 600	Rumania	450
Finland	800	Spain	800
France	2 600	Sweden	5 000
Germany	15 000	Switzerland	2 600
Greece	100	Turkey	100
Hungary	450	United Arab Republic . .	450
India	1 600	United Kingdom	10 000
Ireland	100	USA	25 000
Israel	800	USSR	2 600
Italy	2 600	Venezuela	100
Japan	2 600	Yugoslavia	450

FINANCE COMMITTEE OF THE INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

Summary Report

to the Executive Committee on the Meeting held on 6 January 1967 in the premises of the Union Bank of Switzerland, Zürich

Present: Mr P. M. ARNOLD (Chairman), Prof. O. HORN, Dr R. MORF, Prof. J. C. BAILAR, Jr (by special invitation), Mr G. HANSELMANN, Managing Director, UBS (by special invitation), part time, Dr C. O. GABRIELSON called the meeting every hour by phone from Sweden in order to maintain contact with the proceedings. (Towards the end of the day telephone communication was interrupted because of technical failure).

Agenda

- Items* as submitted to the meeting by its Chairman:
- (1) Possibility of revising membership categories and subventions to IUPAC in some way to relate them to the number of chemists in each country, the size of the chemical industry, or some other measure
 - (2) Payment of travel expenses of titular members by their adhering organizations
 - (3) Company Associates plan
 - (4) Addition of someone from France to Committee
 - (5) Review of costs expected from change in organization and employment of Executive Secretary. Discussion on the Common Market contract.
 - (6) Review of Budget
 - (7) Review of Investments
 - (8) Any other business

Item 1 — Revision of membership categories

The Finance Committee was faced with the problem of finding a better basis for the calculation of the annual dues. Based on statistical figures of the annual turnover in 1965 of the chemical industry of the world (as provided by Prof. O. HORN) a compilation of the figures was prepared. The world total of the turnover in 1965 amounted to roughly 100×10^9 USA \$. From the compilation it may be seen that many of the smaller Adhering

Organizations pay relatively higher amounts, whereas most of the larger chemical powers are still relatively behind with the amount of their dues. The Chairman proposed that in order to stimulate higher dues a logarithmic relationship between dues and number of votes should be the rule.

The Finance Committee *recommends*

- that in principle a new scale of annual dues based on the total chemical turnover be elaborated
- that in order to avoid too frequent annual changes the figures should be rounded off
- that no reduction should be foreseen for those Adhering Organizations which already pay more than their due share
- that new categories of adherence be created, carrying three, five, and between seven and twelve votes in Council

Item 3—Company Associates plan

It was noted that four Company Associates had already paid their annual dues. The campaign in the USA has not yet been officially started because there are open questions of procedure. The US National Committee is very confident that a good start may be made.

The Finance Committee *recommends* that a handling charge of up to 5 per cent be allocated to National Adhering Organizations for their campaigns to acquire Company Associates.

Item 4—Addition of someone from France to the Finance Committee

Prof. O. HORN handed over copies of a letter from Prof. WINNACKER, Chairman of the Board of the Hoechst Company, suggesting that the IUPAC Finance Committee get in touch with Mr JEAN from Pechiney-St-Gobain, with a view to enrolling him as a member of the IUPAC Finance Committee.

Item 5—Review of costs expected from change in organization and employment of Executive Secretary. Discussion on the Common Market Contract

Recognizing the fact that the Divisions will urgently need adequate clerical help through the Central General Secretariat and that according to repeated resolutions an Executive Secretary should be appointed, it seemed obvious that the General Secretariat should be staffed by

- one Executive Secretary, who must have a degree, not necessarily in chemistry, and who must have a good knowledge of languages
- one Assistant to the Secretary General, with a chemical background
- one Assistant Secretary, competent in analytical chemistry
- appropriate clerically-oriented staff

The possible change of IUPAC Headquarters and offices to a city other than Basle should also be considered in the light of its financial implications.

Contract CEE - The new contract as submitted by the CEE authorities in Brussels dated 19/21 December 1966 was carefully studied. Bearing in mind that a successful cooperation with CEE will provide an excellent opportunity for the chemical industry and Company Associates to become really interested in IUPAC affairs, the Finance Committee *recommends* that every effort be made to bring about a good result.

Item 6—Review of budget for 1967

The very detailed budget for 1967, which took into account the answers of Titular Members to a request from the Secretary General for information on whether or not they would claim travel expenses from IUPAC, was considered. The following items gave rise to comments and recommendations:

6.1 Meeting of the Committee on the Teaching of Chemistry in Munich (see also later «general comments») —Taking into account that a meeting in Munich will cost some \$600 more than one held, for example, in London, considering the relationship with a UNESCO contract, and taking due note of Prof. NOYES' comments, the Finance Committee *recommends* that no IUPAC funds be allocated to the Committee on the Teaching of Chemistry.

6.2 The Finance Committee *recommends* that travel expenses of a Titular Member to a meeting be paid only up to an amount not in excess of the cost of travel from the country of origin.

6.3 Joint Commission IUB-IUPAC on Nomenclature —With great reluctance, in view of additional expenditure involved, the Finance Committee *recommends* that a meeting be held in Naples.

6.4 Considering the so-called «clash of meetings», the Finance Committee *recommends* that the Division Committee of the Biological Division should not meet in Prague.

6.5 Noting that one country assesses large taxes on air tickets for foreign travel, the Finance Committee *recommends* that, IUPAC being exempt from taxation in general, only nominal taxes on air tickets be reimbursed by IUPAC Treasury.

6.6 New contract with Butterworths. —In view of the desirability that Nomenclature Rules be given worldwide distribution, the Finance Committee *recommends* that for each volume on Nomenclature an individual contract with IUPAC's Publishers be negotiated.

6.7 After reviewing the proposed budget for the 1967 fiscal year as compiled by the Secretary General, the Finance Committee *recommends* that the tentative budget as compiled by the Secretary General be adopted.

Item 7—Review of investments

Noting that in spite of the present situation on the stock market the market value of IUPAC's assets has not diminished substantially the Finance Committee *recommends* that no changes in IUPAC's assets be effectuated.

Item 8—Any other business

8.1 Biennial account, balance sheet. —With an extreme personal effort the staff of UBS was able to prepare as early as for 6 January not only the final account for UNESCO but also a very close to the point Biennial Treasurer's Report. Whereas for the Conference year 1965 there was a substantial loss of \$ 26 203.83, it has been possible in the non-Conference year 1966 to make some provision for the anticipated heavy expenditure of the Conference year 1967 by realizing a net profit of \$ 19 675.29.

This fortunate situation is mainly due to economies and savings in the Secretariat General owing to shortage of staff, and can only be considered as a short temporary situation.

The Biennial net loss of IUPAC's operation for the period 1965/66 is \$ 6 528.54.

The Finance Committee *recommends*

- that the biennial accounts and the balance sheet be approved
- that sincere thanks and appreciation be expressed to the President of UBS, in particular to the Managing Director G. Hanselmann and his untiring staff
- that thanks be expressed to the Honorary Treasurer

8.2 The Finance Committee *recommends* that instead of spending the available funds equally in all possible branches of chemistry—which has as consequence the fact that every branch and every person receives insufficient financial help, support and stimulation—some clear priorities be designated and strong guide lines be established.

8.3 Help to Developing countries.—While IUPAC will always be ready to lend its expert advice but considering that help to developing countries means finances of the order of \$ 100 millions, the Finance Committee *recommends*

- that IUPAC's modest financial means should not be fragmented by financing help to developing areas.

8.4 Meeting of the Bureau in even years.—Considering that the average cost of holding a Bureau meeting (the meeting in 1966 cost \$ 12191) are bound to increase steadily due to the increasingly widespread distribution of Bureau Members, the Finance Committee *recommends*

- that in even years no Bureau meeting should be held.

8.5 Executive Secretary.—Reference was made to the handwritten letter from the Secretary General to Mr Arnold in which the Secretary General said, «The financial consequences (of employing an Executive Secretary) and the responsibilities should be very carefully studied by the Finance Committee and a survey should be made showing whether IUPAC's regular income is in line with such an appointment».

The Finance Committee *recommends*

- that an Executive Secretary and an Assistant Secretary should be appointed by 1 January 1968 and that meanwhile temporary staff be hired by the Secretary General.

Signed: P. M. ARNOLD

Summary of Report

IUPAC COMMITTEE ON THE TEACHING OF CHEMISTRY

Report of Meeting held in Munich on 10–11 February 1967

Present (Members): Prof. R. S. NYHOLM (Chairman); Prof. J. A. CAMPBELL; Prof. M. OKI; Prof. G. M. SCHWAB; Dr P. SYKES; Mr D. G. CHISMAN (Secretary); Prof. W. KLEMM (President IUPAC); Dr R. MORF (Secretary-General IUPAC).

Present by invitation for part or all of meeting: Prof. BURKHARDT, Head Department of Advancement of Science, UNESCO; Mr E. CARTMELL, Editor, *New Trends in Chemistry*; Mr R. L. SILBER, American Chemical Society.

Apologies for absence: Prof. J. BÉNARD; Prof. W. A. NOYES.

1 Reports prepared for the Committee

1.1 *Matthews Report on Examinations in Chemistry*

This report on the effect of examinations in chemistry in determining curricula in schools, prepared by Mr J. G. MATTHEWS, is now available as a reprint from *Pure and Applied Chemistry Volume II*, through the publishers, Butterworths (price 15s). Some copies are being distributed, particularly in developing countries, through UNESCO.

Prof. J. BÉNARD, at the request of the Committee, has invited Prof. E. LEVY to prepare a supplementary report dealing essentially with those countries whose educational systems are different from those considered in the Matthews report.

1.2 *O'Connor Report in In-Service Training of Chemistry Teachers*

This report, prepared by Prof. O'CONNOR, has been considered in draft form by the Committee and will be published in an amended form in due course.

The Committee in considering this report concluded that there are three major problems facing the teaching of chemistry and the chemistry profession at the present time:

- to encourage more students to take up chemistry at the tertiary level
- to ensure that more chemistry graduates become teachers of chemistry in schools
- to provide in-service training of chemistry teachers as a matter of urgency for all teachers in all countries

With regard to the third problem this could and should be tackled without delay and the Committee are recommending to the IUPAC Executive that the following statement should be adopted:

that in-service courses for teachers should be introduced to provide for a minimum of 4 weeks, and preferably 3 months, retraining every 5 years for all teachers of chemistry in all countries at secondary or high school level.

2 Future Reports

The following reports are to be commissioned:

- (a) Investigation into the extent to which student recruitment into chemistry at a tertiary level is decreasing in member countries
- (b) The recruitment of chemistry teachers

3 *International Testing in Chemistry*

(a) The Committee received, for information, details of draft chemistry syllabuses prepared by the Chemistry Panel of the International Schools Examination Syndicate. This Syndicate is hoping to establish an International Schools Baccalaureat to be taken by pupils in International Schools.

(b) Prof. J. A. CAMPBELL introduced a memorandum suggesting that there should be an international workshop on testing and examinations in chemistry partly as a direct follow-up of the Matthews report and partly in order to exchange views on evaluation procedures and techniques of examining new curricula and to prepare and criticise tests. The Committee supported this suggestion and agreed that such a conference for about 20 participants should be arranged if suitable sponsors and organizers could be found.

The suggestion for a conference on testing is based on the following observations:

- There is a great and growing interest in curriculum reform.
- Many students and teachers use test questions as the main basis of their course.
- Curricula reform without examination reform often results in minimal change in the actual teaching and learning processes.
- Some of the most successful curricula reforms have actually been initiated by changing test procedures.
- Whilst examination practice varies from country to country it may be that much of the variation is due to tradition rather than differences in aims.

4 *UNESCO/IUPAC Activities*

4.1 *Bangkok Pilot Project*

The Committee received written materials and a report on the present position with respect to the Chemistry Pilot Project for Asia based in Bangkok. This report was supplemented by oral comments by Prof. J. A. CAMPBELL following his recent visit. Particular reference was made to a training course for 30–35 Thai teachers to be held in April 1967 for which many visiting consultants would be available. It was noted that the new Director of the Project, Dr E. C. WATTON, had had discussions with members of the IUPAC Committee in London in October 1966 and that he was in correspondence with individual members on specific topics.

4.2 *University-level pilot project on crystallography and the physics and chemistry of the solid state*

The proposals for this new UNESCO project were discussed and it was agreed that IUPAC should be associated with it, as requested. The Committee considered, however, that although they were in favour of encouraging the teaching of aspects of crystallography at undergraduate level it should be recognized as part of an integrated chemistry course. It would be undesirable to place undue emphasis on the structural aspects of chemistry at the expense, of say, energetics, or rate and mechanism of reactions.

4.3 *'New Trends in Chemical Education'*

The Committee received copies of the first volume of this publication sponsored by UNESCO, and expressed appreciation to UNESCO for the concept and to Mr E. CARTMELL, Editor, for the high quality of the first issue. It was noted that between 2000 and 3000 copies had been printed and some were being distributed by UNESCO to official organisations and individuals on their special mailing list. Additional copies are available on sale through the usual UNESCO agents.

5 *International Conference on Chemical Education*

It was reported by Mr R. L. SILBER that the American Chemical Society were exploring the possibility and desirability of arranging an international conference on chemical education, possibly in August/September 1967, with which the IUPAC Committee on the Teaching of Chemistry might be associated. The aim of such a conference would be essentially to review curriculum development in chemistry in various countries, but Mr SILBER agreed that it might be possible to devote one session of the conference to the specific problem of recruitment of chemistry teachers.

Approved by R. S. NYHOLM, President

Report to Council of XXIVth Conference

Prague, 29 August–1 September 1967

1. Introduction

Our first report to the IUPAC Conference Council was delivered in Paris in July 1965. On that occasion we outlined our objectives, indicating the subjects to which high priority was to be given. Considerable progress has been made since that time, but the rate at which we are able to proceed is still seriously affected by the need for more financial help. We are grateful to the IUPAC Treasurer and Council for part of our funds and to UNESCO for assistance with specified projects. Help from UNESCO is unfortunately limited to projects in which they are specifically interested; this is understandable in view of their constitution. By overlapping certain activities of UNESCO and IUPAC it is possible to bring together the members of our Commission at periodic intervals to discuss our work. However, it is essential that detailed written reports be available for evaluation by members before coming to the meeting. This involves commissioning people to write these Reports; of course they naturally receive our honorarium and some expenses. So far this sum has been very modest (£50–£100) and in no way compensates for the time and effort involved. Ideally good technical/secretarial help is needed to collect and classify educational data from various countries. Unreliable data is worse than no data; thus on two subjects upon which Reports were commissioned by the British Government recently it was later shown that early *tentative* conclusions were erroneous because of inadequate or erroneous information.

We have also been reluctant up to now, to sponsor large Chemical Education Conferences until adequate information was available for discussion. We feel that far too many educational conferences fail to reach effective conclusions because the delegates discuss *opinions* rather than *established factual data*.

We believe however, that the time has now come when we can usefully sponsor Conferences both National and International on Chemical Education topics and have some specific proposals to put before the Council of the XXIVth IUPAC Conference as discussed below. It must be stressed however that we have no funds at present to hold such Conferences and have had to emphasize this to various interested groups who are keen to obtain our support.

2. Developments since July 1965

Our first report has been published; this dealt with the effect of Examinations upon the Curricula of Chemistry in Schools (the Matthews Report). This has been widely acclaimed as pin-pointing various important problems, but it was necessarily limited in scope to *written* examinations. It is hoped to produce a supplement dealing with Continental Type Oral Examinations, but so far it has not been possible for the person responsible for this to complete the job. We are keen to foster, in due course, a discussion which will bring out the relative advantages and disadvantages of the two systems and ideally provide guidance as to the proportion which seems desirable at various levels of sophistication in the teaching of Chemistry.

The Committee also obtained a draft report on the In-Service Training of Chemistry Teachers and this has been discussed. It was felt that before this was published as a IUPAC Report some supplementation with data from a wider range of countries was necessary. This work has now been completed and the Report should be available shortly. However, even *before* the Report is published it was considered that a formal recommendation should be made to the Council as a matter of urgency. Recognizing that the *factual* content

of Syllabuses is changing today even more rapidly than ever before and that the *approach* to the teaching of chemistry *via* the use of more physical principles (especially thermo-dynamics and energetics generally) frequent and adequate re-training courses for teachers are essential. If adopted it is hoped that wide publicity can be given to the following recommendation as an authoritative statement from the IUPAC Executive to member countries. The resolution is "That in-service training for teachers should be introduced to provide for a minimum of four weeks, preferably three months, re-training every five years for all teachers of chemistry in all countries at the secondary or high school level".

A third Report is at present being prepared for discussion at the end of 1967. This deals with "the extent to which recruitment of students into the study of chemistry at the tertiary level is decreasing in member countries". Data are available to the United Kingdom where the decline is very serious. (Not only has the percentage of students studying Chemistry at the A Level [roughly equivalent to first-year chemistry in the USA, Australia, New Zealand and many Continental Universities] fallen dramatically during the past five years but last year the absolute number of candidates decreased by over 1000.) A similar situation obtains in Mathematics and Physics. One of the effects in the United Kingdom is that whereas there are many good applicants for places in Arts and the Social Sciences there were 1600 *vacant* places in Science and Technology in British universities in October 1966.

We are anxious to obtain reliable data before discussing the reasons for the decline in the United Kingdom but many possible reasons and tentative solutions have already been advanced. It is feared that similar polarisation away from chemistry is occurring in many other member countries of IUPAC. We believe that not only must we encourage more students to obtain degrees in Chemistry but also more Chemistry graduates need to be encouraged to teach Chemistry in schools—where the students are deciding on their future careers. It is hoped to commission a Report on "Methods for the Supply and Recruitment of Chemistry Teachers" in the near future.

3 *Future Activities*

We are also very much concerned with the education and training of technicians. Attention is drawn to the valuable article on "A Basic Curriculum for Chemical Technicians" as outlined in "Chemical and Engineering News" of 22 May 1967. This was produced by the American Chemical Society *ad hoc* Technicians Curriculum Committee. We hope to present a report covering other countries at a later date.

Finally we consider that the retraining of chemists in industry, government service and private practice needs careful consideration. We would welcome the views of Delegates on the desirability of holding an International Conference on the Retraining of Chemists, dealing both with

- retraining of chemistry teachers,
- retraining of chemists in industry, government service and private practice

Such a conference could review the methods at present being adopted to achieve the above and stimulate authorities in member countries both to *allow* and *encourage* chemists to be brought up-to-date.

In conclusion I would like to thank all members of our Commission on the Teaching of Chemistry, especially our secretary Mr D. CHISMAN for their help at all times. Comments on the foregoing from member countries during and after the Prague Meeting will be greatly welcomed.

R.S. NYHOLM, Chairman

Annex to Council Minutes

THE IUPAC STANDING COMMITTEE ON CONGRESS ORGANIZATION AND PROGRAMS

Following is the text of the recommendation concerning a Committee on Congress Organization and Programs that Dr LONG presented on behalf of the Delegation from the United States of America before the Council at the XXIVth Conference of IUPAC held in Prague:

“The Delegation from the United States of America recommends that the Bureau consider the establishment of an IUPAC standing Committee on Congress Organization and Programs. Our preliminary analysis of the problems that the National Adhering Organization for the United States will face in planning and managing the 1971 Congress of IUPAC makes us believe that such a Committee could be very valuable. In our view, the proposed Committee could assist in several areas:

- (1) From its records, and from the knowledge and experience of the Committee members, it could give important operational advice to the National Committees responsible for individual Congresses.
- (2) It could give assistance in selection of the components of the scientific programs of the Congresses.
- (3) It could assess the successes and difficulties of each Congress as it occurs and use these observations to recommend appropriate changes in organization or programming for subsequent Congresses.
- (4) It could develop, for potential use by the Bureau, specific recommended procedures for program development, manuscript review and selection, and other aspects of the best organization of Congresses.

We are persuaded that the continuity and expertise this Committee could provide would be very helpful to all National Committees charged with responsibility for an IUPAC Congress.”

US Delegation members

ORDRE DU JOUR DE LA XXIV^E CONFÉRENCE DE PRAGUE

Réunion du Conseil – 29 août 1967/1^{er} septembre 1967

- 1 Ordre du jour définitif
- 2 Approbation du Procès-Verbal (XXIII – Paris)
- 3 Nouvelles Organisations adhérentes, changement de catégories
- 4 Annonce des candidats aux élections
- 5 Date et lieu des élections
- 6 Rapport statutaire du Président
- 7 Rapport biennal du Trésorier
- 8 Rapport du Comité financier. Examen de la méthode du financement et de la structure des contributions de IUPAC – commentaires et recommandations de la part de l'organisation adhérente des Etats-Unis de l'Amérique, ayant trait au rapport du Comité financier.
- 9 Budget pour 1968 et projet de budget pour 1969
- 10 Rapport des Présidents de Divisions. – Mémo KONDRATIEV
- 11 Publications
- 12 Rapport du Comité pour l'enseignement de la Chimie
- 13 Approbation par le Conseil des décisions prises par le Bureau et le Comité exécutif depuis la XXIII^e Conférence
- 14 Elections
- 15 Statut juridique de l'IUPAC
- 16 Siège de l'IUPAC, statut 4.3
- 17 Compagnies associées
- 18 Patronage
- 19 Organisations associées
- 20 Coopération avec les Agences des Nations-Unies et d'autres organisations internationales
- 21 Rapport des Présidents de Divisions sur l'activité future des Divisions
- 22 Détermination de la langue dans laquelle seront rédigés les documents officiels – Statut 5.405
- 23 Dates et lieu de la XXV^e Conférence et du XXII^e Congrès
- 24 Divers

AGENDA FOR THE XXIVTH IUPAC CONFERENCE COUNCIL MEETINGS

Prague, 29 August and 1 September 1967

- 1 Finalization of the Agenda
- 2 Approval of the Minutes of the XXIIIrd (Paris) Meeting
- 3 New Adhering Bodies, changes of categories
- 4 Announcement of nominations for Officers and Bureau Members
- 5 Announcement of the time of the Elections
- 6 Statutory Report of the President
- 7 Biennial Report of the Treasurer
- 8 Report of the Finance Committee. Consideration of the Financing and Dues Structure of IUPAC – comments and recommendations of the National Adhering Organization of the United States of America relating to the report of the Finance Committee.
- 9 Budget for 1968 and Tentative Budget for 1969
- 10 Reports of the Division Presidents. – Memo KONDRATIEV
- 11 Publications
- 12 Report of the Committee on Teaching of Chemistry
- 13 Ratification by Council of the decisions taken by the Bureau and Executive Committee since the XXIIIrd Conference
- 14 Elections
- 15 Juridical Status of IUPAC
- 16 Headquarters of IUPAC, Statute 4.3
- 17 Company Associates
- 18 Sponsorship
- 19 Associated Organizations
- 20 Co-operation with United Nations' Agencies and other International Organizations
- 21 Reports of the Division Presidents on future activities of the Divisions
- 22 Determination of the one language in which the official records shall be kept, Statute 5.405.
- 23 Date and Place of the XXVth Conference and the XXIIInd Congress
- 24 Any other Business

MINUTES OF IUPAC COUNCIL MEETING

29 August 1967, 11.00–12.30 and 14.00–18.00

Present: The President Prof. W. KLEMM (in the chair), Members of the Bureau and Delegates of the National Adhering Organizations and of the Associated Organizations (see page 25).

All actions necessary for the holding of a valid meeting of the Council had been taken (with the following letters:)

re: XXIVth Conference, Prague, Candidates for elections, 2.9.1966

re: Official Invitation to participate at the XXIVth Conference, 3.1.1967

re: Draft Agenda for the XXIVth Conference, Council Meetings, 3.1.1967

re: Official Invitation to the XXIVth Conference (to Titular Members), 30.1.1967

re: Official Invitation to the XXIVth Conference (to Associate Members and National Representatives), 15.2.1967

re: Council Meeting, IUPAC Conference, 6.3.1967

re: Delegates from the National Adhering Organizations to the XXIVth Conference, 10.3.1967

re: Elaboration of the programme for the Prague Conference/Composition of new Divisions, Sections and Commissions, 27.4.1967

re: Elections, Candidates as proposed by 31.3.1967, 3.5.1967

re: Final Agenda for the XXIVth Conference, End of June 1967

The meeting was opened at 11.00 in the Hotel International in Prague.

At his opening remarks the President first paid tribute to the colleagues deceased since the last Conference, especially to the Nobel prize laureates PETER DEBYE, GEORG V. HEVESY, JAROSLAV HEYROVSKY, RICHARD KUHN, PAUL HERMANN MÜLLER, HERMANN STAUDINGER. Of these, JAROSLAV HEYROVSKY came from the host country. The President paid special tribute to P. M. DEGENS, who rendered great service to the Union in his capacity as secretary of the Division of Analytical Chemistry.

The President thanked the inviting country, Czechoslovakia, the President of the Academy, F. ŠORM, the President of the Organizing Committee, F. ČUTA, the Secretary General of the IUPAC Congress, Dr V. PETŘÍK, and his staff for the excellent arrangements which they have made.

Prof. BRDICKA (Czechoslovakia), Mr GIVAUDON (France) and Prof. MASCHKA (Austria) were elected as tellers for the duration of the meeting.

Minute 1 Approval of the Agenda

The draft agenda as circulated was approved subject to addition of the proposal made by the US delegation.

Minute 2 Approval of Minutes

The minutes of the last meeting as circulated to Adhering Bodies and as printed on page 126ff. in the Comptes Rendus XXIII were unanimously approved.

Minute 3 Change of Category

The Adhering Organizations of Canada, France and Italy had filed applications for transfer from category A 1 to category A 2. In a written ballot, Council accepted these transfers.

Minute 4 Luxembourg is five years in arrears in payment of dues, and has not replied to repeated reminders sent by registered mail.

Resolved:

That a registered letter be sent to the Adhering Organization in

Luxembourg, stating that unless the full amount of the arrears accumulated during the last five years is paid by 31 December, 1967, at the latest, Luxembourg automatically will cease to be a Member of IUPAC (Statutes 9.2, page 5).

Minute 5 Announcement of elections

Names of those proposed as Vice-President, Secretary General, Treasurer and Elected Members of the Bureau together with biographical notes on each candidate, had been mailed in advance as prescribed by Statutes to all Adhering Organizations and were also in the files of each delegation. The procedure for election of Officers is prescribed in the Statutes. The Bureau, according to its statutory powers, had decided that the procedure for the election of Elected Members of the Bureau should be a written ballot in which a simple plurality of votes will be decisive. The President announced that the elections would be held on Friday, 1 September, at 11.00.

Minute 6 Following the proposal of the Bureau the Council

Resolved:

That the Chairman of the Co-ordinating Committee for co-operation with CEE and the Chairman of the *Editorial Board* be *ex officio* Members of the Bureau, unless they are Members of the Bureau in another capacity.

Minute 7 Number of Elected Members

The earlier decision by Council that there should be twelve Elected Members in the Bureau was unanimously reconfirmed.

Minute 8 Report of the President on the State of the Union

In addition to the printed report which was circulated, the President gave a short survey on the main problems facing IUPAC. The report was accepted unanimously without discussion.

Minute 9 Biennial Report of the Treasurer

Biennial report of the Treasurer, with the report of the chartered auditors had been circulated four months before the meeting in printed form. The overall operating loss in 1965 was \$26203.83 whereas for 1966 there was an operating profit of \$19675.29. The Treasurer amplified the printed Report by clarifying a number of details whereupon the Council

Resolved:

That the Treasurer's Biennial Report be accepted and that Mr HANSELMANN, Dr E. RAKOWSKI and Mr PEYER of the Union Bank of Switzerland in Zurich be thanked for their valuable services.

Minute 10 Report of the Finance Committee

Mr P. M. ARNOLD in presenting the Report, drew attention to the Memorial addressed by the US delegation on the subject of Union dues. Prof. H. W. THOMPSON expressed his concern about the provision of finance for the Commission on the Teaching of Chemistry, the importance of whose work could not be overestimated. The Council agreed to receive the Report of the Finance Committee, thanked the Members for the work they had done and called upon Dr R. L. LONG to introduce the Memorial submitted by the US delegation.

Minute 11 Memorial from US Delegation

Dr F. A. LONG explained that the object of the reorganization proposed was to bring the dues of member countries more into line with their degree of chemical activity, and that the desire of his delegation was that the Council should discuss the principles involved. Following a general discussion initiated by the President and in which delegates from Switzerland, Sweden, Hungary, India and New Zealand took part, it was clear that all present admired the courageous and generous attitude of the United States in making their proposal; the latter involved matters too complicated to be settled in open discussion on the Council. On the suggestion of the President, the Council, therefore,

Resolved:

That the Bureau examine both feasibility and repercussions of a possible modification of the present procedure and report their findings to the Council so that they can be considered in detail by the Adhering Organizations.

Minute 12 Budget Estimate for 1968 and 1969

In submitting these estimates the Treasurer explained that many of the items in them are subject to change or removal since a precise budget cannot be made until the Divisions, etc. have submitted their programmes in detail. Subject to this proviso, Council

Resolved:

That the budget estimates for 1968 and 1969 be approved, that the minimum annual dues of member countries be fixed as follows:

Category D	100 \$
Category C	450 \$
Category B 1	800 \$
Category B 2	1600 \$
Category A 1	2600 \$
Category A 2	5000 \$
Category A 3	10000 \$
Category A 4	25000 \$

Minute 13 Reports of the Division Presidents

In accordance with the resolution at the last meeting of Council, Reports of Division Presidents had been circulated in advance with one exception. As a result Division Presidents were able to refer quite briefly to outstanding matters and thereby considerably shortened this part of the Council's business.

Minute 14 Creation of a Division of Macromolecular Chemistry

At the request of the President and the Executive Committee, Prof. O. WICHTERLE had studied the problem of coordinating activity in the field of macromolecular science, a field which cuts across a number of classical disciplines. Two Memoranda giving the results of this study had been circulated to all Adhering Organizations and their delegates. Prof. WICHTERLE had proposed the creation of a new Division of Macromolecular Chemistry and the advantages of this proposal had been described at the meeting of Division Presidents. After a brief discussion on the proposal, in which Prof. G. SARTORI (Italy) suggested that Prof. G. NATTA

should be included as a Member of the new Division, Council unanimously

Resolved:

- (1) That a new Division of Macromolecular Chemistry be created
- (2) That the Bureau frame terms of reference for the new Division so that it can commence its operation immediately.
- (3) That the Division Committee should have the following membership:

Titular Members

C. E. BAWN (UK)
H. BENOIT (France)
S. S. MEDVEDEV (USSR)
S. OKAMURA (Japan)
C. G. OVERBERGER (USA)
G. V. SCHULZ, Germany
G. SMETS (Belgium)
O. WICHTERLE (Czechoslovakia)

Associate Members

A. M. BUECHE (USA)
O. HORN (Germany)
M. LETORT (France)
G. NATTA (Italy)
I. SAKURADA (Japan)

Minute 15 Relationships with IUB

The President referred to the history of the relations between IUPAC and IUB with a view to bringing these two bodies fully into cooperation with one another; the Executive Committee had authorized him with the Secretary General to meet and to discuss with Prof. S. OCHOA, President of IUB, the best means of achievement. Details of a proposed agreement between the two Unions were set out in the Minutes of the Executive Committee and of the meeting with the President of IUB dated 28 April 1967. In the discussion which followed, Prof. W. M. SPERRY gave a historical review of the activities of the Division of Biological Chemistry; he was in general agreement with the proposal although he deplored the disappearance of the Division of Biological Chemistry which it entailed. The Council agreed unanimously that the proposals outlined by the President offered the possibility for a close and friendly relationship which would be in the best interests of both Unions and of chemistry as a whole. Council therefore

Resolved:

- (a) That the Division of Biological Chemistry in IUPAC be dissolved.
- (b) That the Joint IUB/IUPAC Nomenclature Commission be continued as part of the Division of Organic Chemistry.
- (c) That Clinical Chemistry be made a Section of the Division of Analytical Chemistry.
- (d) That coordination of activities of the two Unions be achieved by cross-representation at the IUPAC Bureau level.
- (e) That implementation of the above resolutions be dependent on their acceptance in principle by IUB at its General Assembly in 1967.

Minute 16 Clinical Chemistry

The growing importance and scope of clinical chemistry brought about in part by development of new analytical methods had led to the creation by Members of the Commission on Clinical Chemistry of the International Federation for Clinical Chemistry. The Federation having grown up in association with IUPAC was anxious to see the association maintained in the future and welcomed the suggestions made in Minutes 15 that the present Commission of Clinical Chemistry should become a Section of the IUPAC Division of Analytical Chemistry. The case for continuing association, which had been put to the Executive Committee, was outlined by Dr M. SANZ and Council

Resolved:

That the International Federation of Clinical Chemistry be granted the status of an associated organization of IUPAC.

Minute 17 Publications

Prof. H. W. THOMPSON introduced the Report of the Editorial Board which was circulated to the Council. He drew attention to the fact that Royalties from publications now amounted to some \$14,000 per annum and that this sum was likely to increase further. He also drew attention to the importance of submitting material for publication at the proper time and in a form which involved the minimum of delay in actual printing, etc. He proposed that economy could be achieved without loss of efficiency if the Bureau assumed the duties of the Editorial Board. Council thereupon

Resolved:

To express its warmest thanks to Prof. H. W. THOMPSON and to Prof. B. C. L. WEEDON for their work for the Union and reaffirmed its confidence in them. It *resolved* further that the proposal that the Bureau should act as Editorial Board be accepted.

Minute 18 Memorandum of Prof. V. N. Kondratiev

Prof. KONDRATIEV had circulated in advance a Memorandum which, as he explained to the Council, contained two main proposals;

- (1) that each Commission of a Division should be represented in the Division Committee itself, and
- (2) that National Bodies should be invited to send representatives to meetings of Commissions.

These proposals he felt would guarantee proper liaison between Divisions and their Commissions on one hand, and would keep National Bodies fully informed of the work in progress on the various Commissions. There would also be the further advantage that titular membership of a Commission could be determined solely on the scientific merits of candidates, rather than with the aim of getting a broad geographical distribution. After a short discussion Council

Resolved:

To give approval to Prof. KONDRATIEV's suggestion and to instruct Division Presidents to take the proposals into account when making new elections.

Minute 19 The Teaching of Chemistry

Before calling upon the Chairman of the Commission to present his Report, Prof. W. KLEMM congratulated Prof. R. S. NYHOLM on his knighthood and this was endorsed with acclamation by the Council. In elaboration of his Report, Sir RONALD referred to the disturbing drop in the number of young people electing to study science and in particular chemistry in the UK and in other western countries. He underlined how necessary it is that an attractive picture of chemistry be presented to pupils at school level, since it is at this point that decisions regarding future career are usually taken. The shortage of adequate teachers of chemistry already marked, will, undoubtedly, increase and every effort must be made to increase the supply. He was glad to report that all arrangements for the projected meeting of the Commission in Switzerland at the beginning of 1968 had been made and that the necessary finance would be available. According to information from Paris it appeared that the interest of UNESCO in the work of our Commission on the Teaching of Chemistry is increasing and there is a likelihood that UNESCO will offer a satisfactory contract to IUPAC before the end of the year. At Sir RONALD's suggestion the Council

Resolved:

That in order to provide adequately for the needs of the teaching of chemistry and of the chemical profession it is necessary urgently

- to encourage more students to take up chemistry at the tertiary level
- to ensure that more chemistry graduates become teachers of chemistry in schools
- to provide in-service training of chemistry teachers as a matter of urgency for all teachers in all countries.

The Council further

Resolved:

That Sir RONALD, who had just terminated his fourth year of Chairmanship, be re-elected for another term of four years.

Minute 20 Ratification by Council of the Decisions taken by the Bureau and Executive Committee since the XXIIIrd Conference

All decisions taken by the two bodies were contained in three sets of Minutes which had already been circulated and accepted and were in the hands of all delegates. Prof. G. MILAZZO (Italy), drew attention to the contradiction between Minute 10 of the Bureau meeting in Frankfurt/Main 1966 and Minute 334 of the Executive Committee on the subject of electrochemistry. The President stated that this contradiction was recognized and that it arose through discussions with the President of CITCE, subsequent to the Bureau meeting in Frankfurt. The whole question of the Electrochemical Commission had been referred for further study by the Division of Physical Chemistry. The Council

Resolved:

That subject to the reservation indicated above, the decisions taken by Bureau and Executive Committee since 1965, be ratified.

Minute 21 Juridical Status of IUPAC

The President reminded the Council of its discussion in Paris in 1965 on the necessity for IUPAC to acquire proper juridical status and of its instruction to the Bureau and Executive Committee to take all necessary steps in order to incorporate IUPAC as a non-profit making scientific society and to ascertain in which country the incorporation could most advantageously be achieved. He then wished to report that a careful study, made with the assistance of experts in such matters, indicated that the Canton of Zurich in Switzerland offered the best solution and that the Canton of Zurich and the Government of Switzerland were prepared to offer IUPAC complete tax exemption. Prof. J. LECOMTE reminded the Council that for many years the headquarters of IUPAC were provisionally at the Maison de la Chimie in Paris, but he was satisfied, following the study which had been made of all possibilities, that the decision of the Bureau to seek juridical status and location of the Union headquarters in Zurich was the correct one in the present circumstances.

In reply to a question from the Austrian delegation about the possibility of locating the Union headquarters in Austria, the President said that this had been fully considered before reaching the decision in favour of Zurich.

Council proceeded to a secret ballot in writing. The result of the ballot was:

Incorporation of IUPAC

yes	125 votes
no	— votes
invalid	— votes

Headquarters of IUPAC: Statute 4.3

Zurich	121 votes
Paris	2 votes
invalid	— votes
Total voting	123
$\frac{2}{3}$ majority	83

Minute 22 Company Associates

With a view to effecting closer liaison with chemical industry, to make the work of IUPAC better known, particularly to increase the regular income of IUPAC, a new category of membership (i.e. company associateship) had been created at the last Council meeting. Since then, with the cooperation of National Bodies, IUPAC's plan for Company Associates has been put into operation. A proposal for the approval of 53* Company Associates had been circulated with the agenda. Prof. H. W. THOMPSON drew attention to the fact that, since a number of these Company Associates were already subscribers to the Journal, their acceptance must necessarily lead to some diminution in the amount of royalties received for publications. In further discussion it was suggested that, particularly in the case of smaller countries like New Zealand, it might be desirable for research associations and similar organizations to apply for company associateship, whereas it could not be expected that the small firms composing them would apply individually.

Council

*On Nov. 15th there were 80 Company Associates (pages 20ff.).

Resolved:

That the applications for company associateship be approved and that any established federation or association of companies and research institutes could also apply for membership as Company Associates.

Minute 23 Determination of the Language

According to Statutes 5.405, Council must determine every fourth year, the one language in which official records of the meetings of the Council, Bureau and Executive Committee shall be kept and published. Council accordingly

Resolved:

That English be the language in which official records shall be kept and published.

In a secret written ballot Council votes were cast as follows:

English 115 votes

French 8 votes

Invalid - votes

(Council meeting - Friday, 1 September 1967, at 9.30 a.m.)

Minute 24 Before starting the listed business of the second day of the meeting, detailed information was given on the procedure for conducting the elections. Prof. H. MALISSA read the letter which he had sent, a long time before the Conference, to the Secretary General and repeated that he had withdrawn his candidature for the Vice-Presidency.

Minute 25 The meeting was informed that the National Adhering Body of Brazil had entrusted Prof. V. DEULOFEU (Argentina) to be its official delegate to Council and that he had been instructed accordingly. Consequently Prof. DEULOFEU was given the ballot paper for Brazil (category B—with 4 votes)

Minute 26 Standing Committee to give advice on the Organization of Congresses
In the context of the information given by the various organizers of Symposia, Prof. F. A. LONG explained in detail the Memorandum prepared by the United States Delegation, with regard to the possibility of establishing The Standing Committee, To Give Advice To Organizers of Congresses.

The 1971 Congress will probably be the biggest Congress ever held. The magnitude of the task of organizing this congress can have a stimulating effect which may lead to a fruitful exchange of experience with a view of improving the efficiency of Chemical congresses throughout the world. It was

Resolved:

That the proposal of the U.S. Delegation (see page 100) be accepted in principle and referred to the Bureau.

Minute 27 President W. KLEMM informed the meeting in great detail about the cooperation of IUPAC with ICSU, of which Prof. THOMPSON was Past-President and Prof. KLEMM Vice-President.

Minute 28 Elections

As already announced in the first meeting the election procedure was started punctually with the election in a secret ballot of the Vice-President.

Present:

Delegations with a total of 129 votes. 15 Adhering Organizations, with the total of 27 votes, were not represented.

First ballot:

Dr A. L. G. REES	51
Prof. J. LECOMTE	48
Prof. G. SEMERANO	18
Prof. L. MARION	12

Second ballot:

Dr A. L. G. REES	71
Prof. J. LECOMTE	46
Prof. G. SEMERANO	12
Total voting	129, majority 65.

The meeting rose and with acclamation congratulated Dr REES as the new Vice-President.

In a secret ballot were elected:

Secretary General:	Dr R. MORF	122 votes
Treasurer:	Prof. J. C. BAILAR, Jr.	129 votes

Election of the Elected Members of the Bureau: As decided by the Bureau this election was conducted in a secret ballot in which plurality of votes was deciding.

Result of the ballot:

Prof. H. W. THOMPSON	109
Prof. J. LECOMTE	89
Prof. S. SHIBATA	79
Prof. F. WEYGAND	78
Prof. G. SARTORI	75
Prof. K. S. PITZER	74
Dr M. VAN RYSELBERGE	65
Prof. F. L. WARREN	42
Dr W. ZATTAR	22
Prof. P. FAVARGER	12

As there were five vacancies to be filled, Professors THOMPSON, LECOMTE, SHIBATA, WEYGAND and SARTORI were declared elected.

Minute 29 The reports of the Division Presidents are recorded on pages 121ff.

Resolved:

That the reports of the Division Presidents be formally received and that those recommendations involving financial commitment be referred to the Bureau and Executive Committee for consideration.

Minute 30 CITCE

The Minute of the XXIIIrd Conference, page 132 (4) is cancelled. "At its meeting at Scheveningen, the Executive Committee discussed the relations between IUPAC and CITCE, and proposed:

- (a) CITCE being an associated organization of IUPAC, close liaison for cooperation should be established by mutually delegating observers to both governing bodies.
- (b) The elaboration and publication in tentative and final form for matters where international agreement is essential, such as Symbols, Terminology, Definitions, Nomenclature and Standards be exclusively made by IUPAC.
- (c) CITCE be invited to make recommendations to IUPAC with regard to planning and undertaking such work.
- (d) It be proposed to the Bureau and Council that the Electrochemical Commission within IUPAC be terminated.
- (e) The Division of Physical Chemistry be urged to set up special work-

ing groups of experts in the field to deal with all items such as Symbols, Terminology, Definitions, Nomenclature and Standards."

Contrary to (d) and (e) of this proposal, the Commission on Electrochemistry hoped to be maintained, with the same number of members but with a new personnel and a revised programme.

- (1) No Voting occurred.

It was resolved:

That the Physical Chemistry Division be requested to report to the next Council Meeting about the procedure of cooperation with CITCE.

Minute 31 Associated Organizations

The status of Associated Organizations was granted to

- (a) the International Committee on Electrochemical Thermodynamics and Kinetics (CITCE)
- (b) the International Federation of Clinical Chemistry
- (c) the Congress of Catalysis

Negotiations concerning cooperation with the Comité des dérivés tensio-actifs (CID) and the International Union of Nutritional Science (IUNS) are still pending.

Minute 32 Place and date of the Congress and Conference 1969

Dr REES repeated the invitation of the Australian Academy of Science to hold the XXIInd Congress of Pure and Applied Chemistry in Sydney from 20 to 27 August, 1969.

An invitation for the XXVth Conference had been received in writing before the meeting from the Belgium Adhering Organization to hold the Conference in Liège, Belgium. However, the Italian Delegation, from the floor, invited the Union to hold the Conference in Rome. The Secretary General informed Council of a letter from the German Adhering Organization assuring the Union that if no other invitations were received the Deutsche Zentrallausschuss für Chemie would be happy to accommodate the Conference in Frankfurt. In a secret ballot the result was in favour of Rome. It was

Resolved:

That the Italian Adhering Organization fix at their preference a date for the XXVth Conference around the end of June or the beginning of July 1969 and that the holding of a Symposium on a topic of very general interest, e.g. air pollution, in connection with the Conference should be considered.

- Minute 33* The meeting also re-confirmed its decision (Minute 21B of the Paris Conference), that the XXVth Conference and the XXIIIrd Congress of IUPAC will be held in the United States in 1971.

- Minute 34* As no further matters were raised under any other business, President KLEMM expressed sincere thanks to all those who assisted him during his presidency, especially to the leaving President, Lord TODD. Then he handed over the presidency to Academician KONDRATIEV with his congratulations and best wishes. President KONDRATIEV thanked the outgoing President most heartily for the efficiency, devotion, and competence with which he had conducted the Union affairs. This was endorsed with acclamation by Council.

The meeting was closed at 5.00 p.m.

Votes of Thanks

The Secretary General wrote official letters of thanks to the hosts.

Annex to council minutes

ITEM 8, COUNCIL MEETING

Memorial addressed to the Council of the International Union of Pure and Applied Chemistry at its XXIVth Conference in Prague, Czechoslovakia, August 1967

It has long been evident that the subscriptions paid by the Adhering Organizations are insufficient to support the activities IUPAC is now conducting. Many opportunities for important and useful activities constantly arise, but the lack of funds has prevented acceptance of them.

It has been necessary to obtain donations from various sources, notably the pharmaceutical companies in Switzerland, the Royal Society in the United Kingdom, the Bunsengesellschaft in Germany, and the National Science Foundation and the IUPAC Fund in the United States. Some countries, such as the USSR, have contributed by paying expenses of resident titular members. The Company Associates Plan has been recently adopted for the purpose of obtaining funds.

Although the Union has remained solvent through gifts, it is important for its future welfare that it have continuing financial support from the Adhering Organizations at a level sufficient to pay for its basic operations.

The Statutes define IUPAC as an "association of organizations each representing the chemists of a member country". It would seem equitable for the support of the Union to be related to the number of chemists represented by the several Adhering Organizations. There is a difficulty, however, in determining the number of chemists in the different countries, because there is no uniform definition of a "chemist". In some countries it might include chemical engineers. In some it might be limited to those holding the doctor of philosophy degree, while in others it might include also those with bachelor or master of science degrees.

A figure that is available (at least for the more industrialized countries) is the chemical turnover of the country. It seems reasonable that the number of chemists in a country is roughly proportional to the chemical turnover. Therefore, the chemical turnover of the country should be a fair measure of the subscription that an Adhering Organization should pay to IUPAC.

The attached Exhibit I shows the countries now in Category A of IUPAC. In the first column is given the approximate 1965 turnover of the chemical industry in billions of US dollars. The second column shows the ratio of the chemical turnover of each country to the average chemical turnover of Germany and the United Kingdom, with that average taken as 100. The third column shows what the subscription of each country to IUPAC would be if it paid approximately in proportion to its chemical turnover, with Germany and the United Kingdom each paying \$10000 per annum. The fourth column shows the amount each Adhering Organization paid to IUPAC in 1966. There is little correspondence between the amount actually paid and what appears to be an equitable amount.

The US National Committee for IUPAC recommends that the suggestion made by the Finance Committee be adopted, and that a subscription schedule based on the chemical turnover as a measure of the numbers of chemists of the member countries be established. This may be done by amending Sections 3, 5, and 9 of the Statutes as shown in the attached Exhibit II. The proposed amendments fix the category for an Adhering Organization.

If the premise on which this proposed revision of the Statutes is based is accepted as valid, the membership categories we propose are related to the

numbers of chemists in the member countries. Therefore, the numbers of votes in Council assigned to the new categories of adherence are more equitable than those now in effect, because they are no longer random but are related to the number of chemists represented by each Adhering Organization.

Changes in the Statutes can be made only after notice in writing ten months before the meeting of the Council at which they are to be considered. Therefore, the proposals herein cannot be acted upon at this meeting of the Council. The US delegation brings them in now to provide maximum time for consideration and discussion.

Exhibit I

	1965 chemical industry turn- over, millions US \$	Ratio of turn- over to average of UK and Germany	US \$ payment proportionate to UK pay- ment of \$10000	1966 payment to IUPAC US \$
<i>A-4</i>				
USA	41.6	500	50 000	25 000
<i>A-3</i>				
Germany	8.5	100	10 000	10 000
United Kingdom	8.0	100	10 000	10 000
<i>A-2</i>				
Sweden	0.6	7	700	5 000
<i>A-1</i>				
Australia	0.6	7	700	2 600
Belgium	1.0	12	1 200	2 600
Canada	1.9	23	2 300	2 600
Denmark	0.3	4	400	2 600
France	5.7	69	6 900	2 600
Italy	4.9	59	5 900	2 600
Japan	8.1	98	9 800	2 600
Nether- lands	1.2	14	1 400	2 600
Switzer- land	0.8	10	1 000	2 600
USSR	11.4	137	13 700	2 600

Exhibit II

Proposed Amendments to IUPAC Statutes

Amend and re-number paragraphs 3.3 and 3.4 relating to *Membership* to read as follows:

- 3.3 There shall be several categories of membership, derived from the annual turnover of the chemical industry of the member countries, which is a measure of the numbers of chemists in the member countries, in accordance with the following schedule:

Category	Annual turnover of chemical industry of member country millions of US \$ equivalent
1	less than 100
2	100— 199
3	200— 299
4	300— 399

5	400- 499
6	500- 999
7	1 000- 2 499
8	2 500- 4 999
9	5 000- 9 999
10	10 000-19 999
11	20 000-39 999
12	40 000-79 999

- 3.4 A country requesting admission to the Union of its proposed Adhering Organization shall provide full information about its proposed Adhering Organization and shall assist the Secretary General in determining the chemical turnover of the country, so that it may be assigned to the proper category of membership by the Executive Committee.
- 3.5 Every 4 years beginning with 1970, the membership category of each Adhering Organization shall be examined by the Executive Committee, and any Adhering Organization may be assigned to a different membership category if necessary to maintain equitable representation of its chemists in the Council.
- 3.6 If an Adhering Organization impugns the category to which it or any other Adhering Organization is assigned by the Executive Committee, the matter shall be decided by vote of the Council. In such vote, the number of votes cast by each Adhering Organization shall be that corresponding to the category previously assigned by the Executive Committee.
- 3.7 An Adhering Organization may withdraw from the Union provided that it has fulfilled its financial obligations, or may be removed from the Union for failure to fulfill such obligations.

Amend paragraph 5.1 relating to *The Council* to read as follows:

- 5.1 The Council, to which the Bureau, Executive Committee, Divisions, Sections, Commissions and all other bodies of the Union are responsible, is composed of the Delegates of the Adhering Organizations. The number of votes in the Council for each Adhering Organization is fixed in accordance with the category to which such organization is admitted, namely

Category	Number of Votes
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12

Each Adhering Organization shall appoint one or more delegates for every Council meeting, but not more than one delegate for each vote to which the Adhering Organization is entitled. If the number of delegates appointed by the Adhering Organization is

fewer than its number of votes, it may nevertheless cast the full number of votes to which it is entitled; provided, that votes in excess of the number of appointed delegates shall be cast only by a delegate or delegates deputed in writing by the Adhering Organization to the Secretary General at least ten days before the meeting of Council at which the votes are to be cast.

Amend paragraph 9.1 relating to *Finance*, and number the resulting paragraphs 9.1 through 9.3 as follows. Also, renumber the present paragraphs 9.2 through 9.5 as paragraphs 9.4 through 9.7.

- 9.1 Each Adhering Organization shall pay an annual subscription to the Union in accordance with its category of membership before 31 December each year. Subscriptions shall be computed from a unit subscription, the amount of which shall be determined by the Council at each of its Conferences. The subscription for each membership category shall be a multiple of the unit subscription as follows:

Category	Subscription multiple
1	1
2	2
3	3
4	5
5	7
6	10
7	14
8	20
9	30
10	60
11	120
12	240

- 9.2 Travel expenses of officers, committee members, or titular members of Divisions or Commissions paid by an Adhering Organization shall be accounted as partial payment of its annual subscription.
- 9.3 If an Adhering Organization shall be unable or unwilling to pay the subscription corresponding to the membership category to which it is assigned by the Executive Committee, it shall be assigned to the lower category and number of votes corresponding to the subscription it is willing and able to pay. Under such circumstances, the Executive Committee may admit an Adhering Organization in category 1 at a minimum annual subscription of US \$ 100.

ADDRESS OF PROF. W. KLEMM AT THE OPENING OF THE CONGRESS

It was one of the most satisfying parts of my activity as President of the Union of Pure and Applied Chemistry, to prepare this Congress here in Prague. The main work, that means, the arranging of all the details, necessary in order to prepare such a big scientific meeting, has been done by the local Organizing Committee which has made all efforts to make the Congress successful. I would like to express hearty thanks to the Czechoslovakian Academy of Science, with our colleague Professor ŠORM as the President, who has initiated this Congress and who has provided the considerable financial support which is needed. Professor ČUTA and his staff, especially Dr PETŘÍK, have had the very extensive work of the preparation. Together with the Czechoslovakian Colleagues, the Presidents of the Divisions of Analytical, Applied and Organic Chemistry, Prof. MALISSA, Prof. WEST, Prof. TRUHAUT and Prof. WEYGAND, have chosen the special subjects of the lectures and the speakers of the general lectures. The Secretary General of the Union, Dr MORF, has made available his great experience in the organization of Congresses. You see, that there was not very much to do for the President; it was sufficient to discuss several times, in Paris and twice in Prague, the general lines of the organization of the Congress and it is a pleasure for me to make the statement that all these discussions have passed in full harmony. I am happy to say that during this time of preparation, we have become good friends.

As you know, this Congress has three main subjects: Automation in Analytical Chemistry, Toxicological Chemistry and Chemistry of Nucleic Acid components.

When Professor WICHTERLE at the Bureau Meeting in Basle gave the invitation of the Czechoslovakian Academy of Science to hold the 1967 Congress in Prague with the main subject Analytical Chemistry, there was some doubt in the beginning, whether Prague was not too close to Moscow, the place of the so-successful 1965 Congress. However, the possibility, to come to this wonderful city and to devote a congress mainly to analytical chemistry, was the reason that the Bureau decided to accept this kind invitation with deep appreciation.

Analytical Chemistry has a particular position in the chemical community. The fact that at the University, the student begins his studies with analytical work makes it clear, that analytical chemistry is the basis of chemistry, and indeed there is no progress in chemical research without the help of the analyst, and in chemical industry all steps from the raw material to the final product demand analytical control. Certainly, nobody underestimates the importance of the analytical laboratory; but on the other hand there are many chemists who consider analytical chemistry as an auxiliary science without independent scientific quality. In the past, there may have been some periods in which analytical chemistry was rather empirical and in which it depended very much on the skillfulness of the analyst whether the result of the analysis was correct or not. But at present the situation is quite different. Science and industry demand that the analytical results be more and more refined and that very low impurities be detected and quantitatively estimated. Moreover, for many industrial purposes the time for an analysis is increasingly restricted; in many cases the performance of an industrial operation is based on analytical data and therefore often only minutes—in some cases part of a minute—are tolerable for the analytical work. Finally it is impossible that values of such importance depend on the skillfulness of an analytical assistant and that, for example, on a Monday morning the results fluctuate more than on normal days! Analytical chemistry today

makes use of many physical methods; complicated and expensive (!) types of apparatus have been developed in which electronics play an important part. Today an analytical chemist must know chemistry, physics, mathematics and electronics; he cannot be anymore a specialist in a narrow field! Therefore the modern analytical chemist deserves very high esteem in the chemical community—the more chemists of high quality who work on analytical tasks, the better for chemistry as a whole! For this reason we are happy that this meeting deals primarily with a special and very important field of analytical chemistry.

The second subject of our meeting is *Toxicological Chemistry*. This field has gained importance for mankind continuously and will become one of the central fields of IUPAC's activities in the near future. I shall not discuss this in detail, but if you will look at the programmes of the symposia sponsored by IUPAC and at the reports of our divisions, especially of the Applied Division, you will recognize that the questions of dangerous human environments are being considered by IUPAC with priority.

The third subject of this Congress concerns *Organic Chemistry*. From the scientific, and above all from the industrial point of view, organic substances are extremely important for chemistry. The last Congress in Moscow did not deal with questions of organic chemistry; therefore we felt it necessary that—besides the many symposia concerning subjects of organic chemistry—at this Congress organic chemistry should be represented.

Ladies and gentlemen! It was my intention to point out to you the general ideas of the Congress. It is my privilege to express very hearty thanks to all who have prepared this Congress in such an excellent way and to wish that you will be satisfied with your stay at Prague.

Thank you!

W. KLEMM

Past-President of IUPAC

ADDRESS TO THE XXI CONGRESS

presented by the President, Prof. V. N. Kondratiev, in Prague

I shall not speak here on the importance of the three directions chosen by our Czecho-Slovak colleagues as the main topics of our Congress. These were treated in a clear and precise way by Prof. KLEMM.

A very great number of congresses, conferences and symposia concerned with various fields of science are convened every year all over the world and their contribution to science is very essential. However, IUPAC Congresses are of a still greater importance, as these are sponsored by a Union representing, in fact, all chemistry and giving its name to meetings of highest quality. Every IUPAC Congress, besides the value it has in promoting science and in offering opportunities for best personal scientific contacts, is also a reflection of the IUPAC activities, and its success is that of the IUPAC as well.

I am quite certain that our XXIst Congress will proceed with utmost success, this is my sincerest wish with which I permit myself to end my short tale.

On behalf of IUPAC I would like to express our heartiest greetings to all participants of our Congress. Thank you.

Prof. V. N. KONDRATIEV, President

SECTION OF CLINICAL CHEMISTRY

(Attached to the Bureau)

Activity Program

The different activities of the Section are carried out in its commissions.

1. *Commission on quantities and units*

The present recommendations (book of 100 pages of the former sub-commission) must be widely published in a shortened form:

- (1) Edition of a shortened version of the recommendations and presentation to the various pertinent editorial boards that it appear in their respective periodicals.
- (2) Seeking contact with pertinent bodies such as national societies of clinical chemistry and editorial boards concerning approval and implementation of the recommendations.
- (3) Supervising the edition in other main languages of the shortened version and possibly of the entire recommendations.
- (4) Further development of the group of kind of quantities used in clinical chemistry and submission of proposals.
- (5) Study of the possibility of an *international glossary of quantity names*.

Members (4): Dr R. DYBKAER, Copenhagen (President); Dr K. JØRGENSEN, Copenhagen; Dr B. ARMBRECHT, Washington (Food and Drug Administration); Prof. P. MÉTAIS, Strasbourg (Titular Member)

2. *Commission on teaching*

In continuation of the work of the former sub-commission, teaching in clinical chemistry is an extremely urgent problem. This Commission should work in close collaboration with the Committee of Teaching (Prof. NYHOLM). Recommendations for a teaching programme, especially in countries where clinical chemistry is just beginning to be organized, are of great importance.

Members (3): Prof. M. RUBIN, Washington (President) (Titular Member); Prof. A. L. LATNER, Newcastle (Titular Member); Dr P. LOUS, Copenhagen (Titular Member).

3. *Commission on automation*

Automation is being massively introduced into clinical chemistry and this process will become very much intensified in the coming years. Great hospital laboratories and governments with a social security programme as well as international organizations with population survey programmes are primarily interested in this development. Recommendations on performances of semi-automatic and automatic systems and consulting as well in terminology as in methodology should be presented.

Members (5): Dr M. C. SANZ, Geneva (President) (Titular Member); Prof. J. DE Wael, Utrecht (Titular Member); Dr COTLOVE, Washington; Dr T. P. WHITEHEAD, Birmingham; Dr K. JØRGENSEN, Copenhagen.

I. DIVISION DE CHIMIE PHYSIQUE

Rapport biennal condensé sur l'activité

L'activité de la Division de Chimie Physique depuis la Conférence de Paris se résume à celle de ses Commissions.

La *Commission I.1 des Symboles, Terminologie et Unités* avait publié en 1959 un Manuel de symboles et de terminologie physicochimiques. Elle a continué à travailler à la révision complète de ce Manuel, en liaison avec l'ISO et la Commission SUN s'occupant des symboles et unités à l'IUPAP. La Commission s'est réunie à Paris en 1966 et a élaboré un projet de nouveau manuel, non sans avoir pris contact avec la Commission I.3 d'Electrochimie. Le texte est actuellement soumis aux membres de la Commission et sera examiné à Prague.

La *Commission I.2 de Thermodynamique et Thermochimie* avait organisé en 1965 un symposium, conjointement avec l'Agence internationale de l'Energie atomique à Vienne, sur la thermodynamique des matériaux nucléaires et les propriétés de transport dans les solides; la publication en a paru en deux volumes en 1966, par les soins de l'IAEA. Un symposium est prévu à Heidelberg en 1967 et un à Washington en 1968. Comme autre publication, il faut citer «Experimental Thermodynamics, volume I» actuellement sous presse; le volume II est en préparation.

La *Commission I.3 d'Electrochimie* s'est réunie à l'occasion de réunions du Comité international de Thermodynamique et Cinétique électrochimiques (CITCE). La Commission, qui sera renouvelée à Prague, doit avoir pour but principal de présenter des rapports et recommandations sur les questions de nomenclature, définitions et données électrochimiques.

La *Commission I.4 de Chimie macromoléculaire* a poursuivi ses activités antérieures, en particulier pour collecter et publier des données indiscutables sur les propriétés d'échantillons bien caractérisés de types importants de polymères; les résultats les plus récents obtenus dans ce domaine ont paru dans J. Polymer Sci. en 1966. Il est suggéré d'étendre les activités de la Commission à la chimie appliquée par la création d'une nouvelle Division de chimie macromoléculaire pure et appliquée; c'est là un sujet de discussion pour Prague.

La *Commission I.5 des Données et Etalons physicochimiques* prépare un rapport sur la caractérisation de la pureté chimique des composés organiques; il comportera des articles sur les méthodes et techniques les plus courantes de contrôle de la pureté. Des discussions préliminaires ont été engagées pour établir un rapport semblable pour les composés inorganiques et une monographie sur les méthodes de purification.

La *Commission I.6 de Structure moléculaire et de Spectroscopie* vient de publier un «Dictionnaire multilingue des termes importants en spectroscopie moléculaire», avec le Concours du Conseil national de la Recherche du Canada; il comporte cinq sections, anglaise, française, allemande, japonaise et russe. D'autres publications sont envisagées, en particulier un rapport sur les méthodes normalisées de mesure des intensités en spectrométrie infra-rouge. Il importe de souligner aussi le rôle joué par cette Commission en liaison avec les spectroscopistes d'autres Unions.

La *Commission I.7 de Chimie des Colloïdes et des Surfaces* vient de présenter un rapport intitulé «Proposals for Terminology and Symbols in Colloid and Surface Chemistry», se subdivisant en deux parties, terminologie et liste de symboles. Ce rapport a été soumis, avant publication, à la Commission I.1. Les remarques présentées seront examinées lors de la Conférence de Prague.

La *Commission I.8 de Radioactivité appliquée* (mixte) a organisé dans le passé diverses réunions scientifiques en coopération avec l'Agence internationale de l'Energie atomique, mais aucun depuis 1965. Une réunion pourrait avoir lieu en 1968 sur l'emploi des radio-isotopes en analyse.

La *Commission triple I.9 de Spectroscopie*, qui groupe des spectroscopistes de trois Unions (Astronomie, Physique, Chimie), a été reconstituée sous les auspices de l'ICSU en 1966 et doit se réunir une année sur trois. Elle a pour fonctions de coordonner les symposiums de spectroscopie et aussi, éventuellement, les questions de normalisation, terminologie, nomenclature, etc.

signé: Prof. G. EMSCHWILLER, Secrétaire

The Commission met at 9–12 and 14–16 on 30 August and 9–12 on 31 August (open sessions) and 14–16 on 31 August (executive session). Task group meetings were held on 28 and 29 August. The attendance was:

Titular Members: H. A. SKINNER (Chairman), S. SUNNER (Secretary), C. W. BECKETT, E. U. FRANCK, F. D. ROSSINI, and J. SAUREL. Absent: A. J. EDE and J. I. GERASSIMOV.

Associate Members: L. DEFFET, M. MCGLASHAN, D. M. NEWITT, G. WAD-
DINGTON, and E. F. WESTRUM.

Observers: S. ANGUS, G. ARMSTRONG, M. LAFFITTE, K. S. PITZER, T. PLEBANSKI, J. SUTTON, V. V. SYTCHEV, I. WADSÖ and D. WAGMAN.

Task Groups

(1) *Bulletin of Thermodynamic and Thermochemistry* (Chairman E. F. WESTRUM). The plan for making the Bulletin self-supporting over a three-year period, proposed at the 1965 Conference, has been put into operation. The National Science Foundation agreed to provide "seed" money for a three-year estimated budget (1966–68) for editing and production of the Bulletin at the University of Michigan. Number 9 was published in May 1966 and Number 10 in March 1967. The subscription price is \$ 6. — a copy and the break-even point is reached at a sale of approximately 600 copies a year. For the 1966 issue the sale is now 500 copies. It appears realistic to judge that the 1965 plan will hold. The task group has therefore fulfilled its purpose and was accordingly dissolved.

(2) *Skeleton Tables of Thermodynamic Properties of Gases* (Chairman D. M. NEWITT). After some initial financial difficulties the project has now been put into full operation at a yearly budget of approximately \$ 40000 (January 1967–March 1970). So far, contributing countries are France, Germany, Sweden, UK, and USSR. The Project Centre is at Imperial College, London, and is directed by Dr SELBY ANGUS. Working panels have been set up for carbon dioxide, atmospheric gases, quantum fluids, inert fluids, alifatic hydrocarbons, halogenated hydrocarbons, and ammonia. It is expected that panels will soon be working on multicomponent systems and on correlating functions. Decisions were taken as to the form of Thermodynamic Tables as publication is expected to start before the next Conference in 1969.

(3) *Monographs. Experimental Thermodynamics, Vol. I, Calorimetry of Non-reacting Systems* (Chairman J. P. McCULLOUGH) will be out in October 1967. The work of the task group has been successfully completed and the group was therefore dissolved.

Experimental Thermodynamics of Non-reacting Fluids (Chairman B. VODAR). The shape of the volume is finalized, but the date for publication has been delayed.

(4) *Reference and Calibration Standards* (Chairman S. SUNNER). It was reported that NBS now has the final sample of Al_2O_3 which is currently investigated as a heat capacity standard. Reports on a sample of THAM (tris(hydroxymethyl)aminomethane) prepared by NBS were given by G. ARMSTRONG and I. WADSÖ. CH. BECKETT reported on work in progress using pure metals as heat capacity and conductivity reference standards.

It was recommended to review the possibilities of using existing substances of established purity as single- or multipurpose reference standards

(e.g. benzoic acid and THAM). A close cooperation with the Commission on Data and Standards was found to be needed to keep pace with the increasing need for reference materials.

(5) *Symposia* (Chairman K. SCHÄFER). Following the Prague Conference, the *Symposium on Thermodynamics* was held in Heidelberg, 12–15 September 1967. The Polish Academy of Sciences extended through Dr T. PLEBANSKI an invitation to hold an International Symposium on Thermodynamics, jointly sponsored by the Polish Academy and IUPAC, in Warsaw early September 1969. The invitation was gratefully accepted and the task group was appropriately modified.

(6) *Data Compilation*. D. D. WAGMAN gave a brief summary on discussions within NBS and with Dr GURVIÖH and Dr MEDVEDEV of the USSR, who are engaged in computation work similar to that of NBS. The aim of these discussions is to reach an international agreement on the selection of (provisional) best values for thermodynamic properties of a small number of key compounds which play an essential role in the calculation of great many thermodynamic data.

(7) *Plasma Chemistry*. After discussions prior to the Conference aiming at the creation of a plasma chemistry task group within the Commission it was decided to put up a discussion group for a limited period of time with CH. BECKETT as chairman to prepare a task group with possibly 8 to 10 members. The primary aim of the task group should be to examine the measurements of temperature above 3000 °K.

S. SUNNER

Draft Report of the meeting held in Prague on 30 and 31 August 1967

Present: Dr STAVELEY, Dr SMIT, Dr BROWN, Dr HERINGTON, Dr KIENITZ, Dr MEINKE, Dr PLEBANSKY, Dr STULL, Dr MASHIKO, Dr SAYLOR, Dr FEUERBERG.

(1) *Nominations* see page 34.

(2) Dr SAYLOR reported on the position about the publication of the Ottawa report on purity determination. One contribution is still failing. A deadline has been set so that the report will be fit for printing at any rate before 31 December 1967.

(3) The Chairman reported on the approaches made to NPL for a precise redetermination of the density of water. It was agreed that Dr PLEBANSKY and Dr STULL should prepare a brief memorandum explaining why this redetermination is highly desirable and that steps should be taken to bring this report to the attention of interested Institutions such as NPL, NBS and the American and British Institute of Oceanography.

(4) Dr Smit reported that the comparative investigation on the viscosity scale is going on. The Commission will receive a report when the work is finished. Dr KIENITZ said that the Badische Anilin- und Sodafabrik would be willing to join the investigation.

(5) The Commission discussed how best to publish information on the availability of standardized materials for given properties. It was agreed that Dr STULL, Dr PLEBANSKY and Dr MASHIKO should draft a circular letter using the NRC Subcommittee report as an example. It was further agreed to solicit the help of Dr MORF in sending this letter to all IUPAC National Representatives.

(6) As Dr REES is no longer associated with this Commission it was agreed that Dr BROWN should take his place in helping Dr PLEBANSKY in compiling a list of terms and units with the object of resolving ambiguities connected with them as discussed in the Paris meeting.

(7) Dr STAVELEY reported on the position reached in the preparation of the book on the characterization of chemical purity. He said that half of the manuscripts has been received and corrected. A deadline of 31 December 1967 was fixed for the receipt of the outstanding manuscripts. Dr MEINKE offered to arrange for the reproduction and distribution of manuscripts to other members of the Commission as they become available. Dr STAVELEY reported that he had made provisional application for a grant of \$ 600 from IUPAC funds to enable Dr SMIT, Dr STULL, Dr HERINGTON and himself to meet in Europe in 1968, to assist the completion of the book.

(8) Dr MASHIKO and Dr SMIT reported on the plans of OECD as described by Mme TURGEL of developing a bank for the exchange of pure materials. Dr MASHIKO and Dr SMIT will keep up the contact and have the Commission informed.

(9) The Commission by its nature has a particular interest in the activities of CODATA. If a committee of representatives from different commissions is formed to advise the IUPAC representative on CODATA the Commission on Data and Standards hopes that it will be allowed to be represented on this committee.

(10) The Commission discussed the letter from Dr McADIE of the International Conference on Thermal Analysis raising the question of standard

materials for thermal analyses. It was agreed to send Dr McADIE information on the activity of this Commission and invite him to send the Commission a copy of the report on cooperative experiments on differential thermal analyses now in progress.

(11) The Commission agreed to accept the invitation of the Commission on Thermodynamics and Thermochemistry to establish a joint task force to discuss problems of mutual interest.

(12) Dr HERINGTON raised the question of the use of SI units in physical chemistry and suggested that this subject should be discussed in the near future.

L. A. K. STAVELEY, Chairman, Commission on Physiocochemical Data and Standards

1.5 Commission on Molecular Structure and Spectroscopy

Meeting at Prague, Wednesday and Thursday, 30 and 31 August 1967

This was a business meeting only: technical sessions of the Commission will be held at Madrid on 9 and 10 September in connection with the Ninth European Congress on Molecular Spectroscopy. The following were present:

Titular Members: R. C. LORD, (Chairman) (USA), R. N. JONES (Secretary) (Canada), A. R. H. COLE (Australia), TH. FÖRSTER (Germany), Y. MORINO (Japan), H. W. THOMPSON (UK).

Associate Members: J. LECOMTE (France), S. MIZUSHIMA (Japan).

A letter of apology was received from Titular Member M. A. ELYASHÉVICH (USSR) who was unable to attend.

(1) The Chairman reported with regret the news from Leningrad of the death of Associate Member A. N. TERENCE and the Commission voted to express its official regrets to the Academy of Sciences of the USSR of which Professor TERENCE was a member.

(2) It was announced that the President of IUPAC has nominated R. N. JONES, R. C. LORD, and H. W. THOMPSON from this Commission and V. FASSEL from Commission V.4 to the ICSU Joint Commission for Spectroscopy. LORD and THOMPSON will serve for three-year terms and FASSEL and JONES for six-year terms.

(3) The work of the Commission was reviewed by the Chairman and the Secretary in terms of the activities of the Sub-Commissions. *The Sub-Commission on Infrared and Raman Spectroscopy* is at work on wavelength standards for the far infrared, standards and procedures for far infrared intensity measurements, and methods of laser excitation of Raman spectra. *The Sub-Commission on the Storage and Retrieval of Spectroscopic Data* is active in the study of computer methods of processing spectroscopic data, in conjunction with the CODATA Commission of ICSU. *The Sub-Commission on Units and Terminology* has completed its long-term project of a Multilingual Dictionary of Spectroscopic Terms under the able chairmanship of G. HERZBERG and was dissolved with thanks. *The Sub-Commission on Ultraviolet Spectroscopy* was also deemed to have completed its assigned tasks and was dissolved with thanks.

The composition of the Commission for the period 1967–1969 was then determined (see page 35).

R. N. JONES, Secretary

At the meeting in Paris in 1965 it had been decided to combine the 4 Sub-Commissions on terminology and symbols existing at that time into 2 Sub-Commissions. The first Sub-Commission had to deal with colloid phenomena and with the interface between two fluid phases. The second Sub-Commission was to deal with solid surfaces and with heterogenous catalysis.

The first Sub-Commission had a report on terminology and symbols, which had been discussed at the Paris meeting. An improved version of this report was circulated in the Commission and its Sub-Commissions and it was also sent to the Commissions for Macromolecules and for Electrochemistry, to the CID, to the American Nomenclature Committee on Colloid and Surface Chemistry of the National Academy of Science—National Research Council and to a number of private persons. Comments were obtained from about 30 persons. These have been used in formulating a new version of the report which was circulated in June 1967 within IUPAC, notably to Commission I.1 and to all those who had previously contributed to the report.

Valuable remarks have been obtained which have been discussed at the present meeting in Prague in the presence of two observers (Prof. PAQUOT, Dr LANGE) from CID.

It is hoped that a final or nearly final version of the report can follow within half a year. In this version the nomenclature for solid surfaces as prepared by the second Sub-Commission will be included but nomenclature referring to heterogenous catalysis will not yet be dealt with. The report will be sent to Commission I.1, and after obtaining its agreement it will be sent for publication in the Bulletin.

The Commission's plans for the near future are:

- (1) To finish the report on terminology and symbols,
- (2) To initiate preparation of translations of this report,
- (3) To keep contact with data compilation interests of the US National Academy of Sciences Committee on Colloid and Surface Chemistry,
- (4) To consider several problems of a physical nature rather than nomenclature, e.g. the significance of BET specific surface area should be analyzed and the distribution of standard samples of solids with a large specific surface area should be promoted; methods to determine saturation adsorption ($\theta = 1$), to evaluate p_k of Lewis-Brøstedt sites in aluminosilicate surfaces, and many others should be taken into study. The organisation of symposia on these topics may be undertaken.
- (5) To collect information of teaching of surface and colloid chemistry and to discuss ways and means to promote teaching in these fields.

J. TH. C. OVERBEEK, Chairman

H. VAN OLPHEN, Secretary

SHORT REPORT OF THE PRESIDENT

Since the 23rd Conference of the Union in Paris, July 1965, the work of the Division of Inorganic Chemistry has been centred in its Commissions. A large amount of work has been done (1) by correspondence between the President and/or the Secretary of the Division mutually, and with the Chairmen of the Commissions, in order to meet various questions put to them by the President of the Union or by the Secretary General and (2) between the Chairmen and the members of the Commissions with respect to their activities.

The members of the *International Commission on Atomic Weights* have followed their customary practice of following the scientific journals for the publication of new information relating to atomic weights. The Commission will probably recommend revised values for the atomic weights of at least three elements.

The contact between the members of the *Commission on Nomenclature* has, since Paris 1965, been lively by correspondence and at a meeting in Switzerland. They hope to have another meeting in 1968 and to submit at the Conference of the Union in 1969:

- (1) The final revision of the 1957 Report, including the much enlarged section on co-ordination compounds and rules for the notation of the absolute configuration of co-ordination compounds
- (2) Section D of Nomenclature of Organic Compounds, covering organometallic, organoboron, organosilicon and organophosphorus compounds (to be prepared by a joint Sub-Commission of the Organic- and Inorganic Nomenclature Commissions)

The Conference in Paris, 1965, had led to a thorough reorganization in the field of *high temperatures and refractories*. A small, provisional, commission in this field has been involved in some preliminary work on the determination of the melting point of Al_2O_3 . A joint sample is being prepared and will be distributed, all organized and executed by the High Temperature Chemistry Section of the National Bureau of Standards, Washington, DC, USA.

signed: Prof. J.H. DE BOER

DIVISION DE CHIMIE PHYSIQUE

Définition proposée pour la «mole»

Voici la définition proposée pour la «mole» telle qu'elle figure dans le rapport de la Commission I.1 du Dr WADDINGTON:

“Mole: The mole is an amount of substance of a system which contains as many elementary units as there are carbon atoms in 0.012 kg (exactly) of the pure nuclide ^{12}C . The elementary unit must be specified and may be an atom, a molecule, an ion, an electron, a photon, etc., or a specified group of such entities.”

Meetings of the Division of Inorganic Chemistry

Prague, 30 August 1967

We had three reports of the Commissions.

(1) Dr THODE reported about the work of the Commission on Atomic Weights and presented the report which has been established by correspondence as the Commission did not meet in Prague. Small changes in the atomic weights have been proposed for 3 elements, namely

Neon	20.179 \pm 0.003	instead of 20.183
Magnesium	24.305	instead of 24.312
Chromium	51.996	instead of 51.996 (\pm 0.001)

The table of radioactive elements has been revised. The full report of the work of the Commission is being prepared for publication. The Commission proposes to meet again at the next Conference in 1969.

(2) Prof. JENSEN reported about the work of the Commission on Nomenclature, in particular about the results of the meeting in 1966. Tentative rules on coordination compounds are in preparation. In the red book the section on Isopoly-Ions will be revised. Nomenclature of organo-metallic compounds is also in progress. Naming of the new element 104 has been discussed (Kurchatovium has been suggested). It was agreed that no firm recommendation will be given unless the results have been confirmed independently. Prof. JENSEN reports that the name for element 102 (Nobelium) might be approved by the actual discoverers. Confirmation has however not yet been given.

Prof. JENSEN suggests that in particular within applied chemistry the recommendations given by the Nomenclature Commission should be followed. The Commission proposes to meet both in 1968 and in 1969.

(3) Prof. COLLONGUES reported about the work of the Commission on High Temperatures and Refractories. A team of 12 scientists from 9 different countries is working on the determination of the melting point of aluminium oxide. Work on vapour pressure and evaporation phenomena of some substances is also in progress apart from the organization of meetings and bibliography work.

(4) Coming now to the elections of the members of the commissions, the statement has to be made that the Commission of Atomic Weights and also the Commission of Nomenclature are of a more permanent character than other commissions of the Union. The Statutes do not give sufficient attention to this fact. The Division Committee has in the following elections taken the freedom of making such recommendations that the Commissions can continue with this excellent work. Elections in the Commission of Atomic Weights: Considering the importance of the continuation of the excellent work by the Commission on Atomic Weights re-election of a second term of office is suggested (see page 43). It has further been asked to re-elect the very efficient Secretary Prof. GUÉRON (France, Euratom) for a term of office of 2 years.

Prof. TRZEBIATOWSKA suggests the creation of a section on coordination chemistry. After a very careful discussion the Committee decided to ask Prof. TRZEBIATOWSKA to produce a document and to submit it to the Division. It has been decided that proper attention be given to this document and a discussion in writing will be organized to be followed by a discussion at the next conference, where decisions can be made.

(5) Approval was given to the Budget as worked out and submitted by the Secretary. In addition, a meeting of the Executive Committee of the Division (President, Vice-President and Secretary) should take place in

Paris in 1968. For this meeting the necessary travel and subsistence allowances should be provided in addition to the budget already submitted.

(6) Careful consideration has been given to the elections for the Division Committee, and we hope that Council approve them. Prof. BÉNARD was unanimously elected as President for 1967-71, Prof. GLEMSE as Vice-President and Prof. COLLONGUES for the same period. According to the recommendations by Prof. KONDRATIEV proper representation of the commissions in the Division Committee has been made by electing the Chairman of the Commission on Atomic Weights, Prof. WICHES as a titular member 1967-71 as well as the Chairman of the Commission on Nomenclature, Prof. JENSEN. The Commission on High Temperatures and Refractories is represented by the Secretary of this Commission, Prof. COLLONGUES. As new Titular Members Prof. GUTMANN (Vienna), Prof. NYHOLM (London), and Prof. SPACU (Bucuresti) were elected.

INTERNATIONAL COMMISSION ON ATOMIC WEIGHTS

Final Version of the Report 28.9.1967

Practically the only source of new measurements upon which improved atomic weights can be based is the mass spectrometric determination of "absolute" isotopic composition in which the mass spectrometer is corrected for bias by the measurement of standards of known isotopic composition prepared from separated isotopes of high chemical and isotopic purity. The determinations are somewhat tedious and exacting and few laboratories are willing to undertake such measurements. Thus, the number of changes in the atomic weights in any two-year period is likely to be small. The entire Table of Atomic Weights was recalculated and issued on the basis of $^{12}\text{C} = 12$ in 1961. No changes were made in the atomic weights in 1963.

The Commission on Atomic Weights met in Paris in July 1965 in connection with the 23rd Conference of the International Union of Pure and Applied Chemistry. At that meeting the matter of changes in atomic weights was discussed, and it was decided to recommend that the atomic weights of three elements be changed. The changes are minor as can be seen from the following tabulation:

	1965	1961
Copper	63.546 ± 0.001	63.54
Bromine	79.904 ± 0.001	79.909 ± 0.002
Silver	107.868 ± 0.001	107.870 ± 0.003

The reasons for these changes and references to the measurements from which the atomic weights are calculated were not published after the 1965 meeting. They will be discussed in some detail later in this report, since it has been the policy of the Commission to publish the reasons for any changes.

In 1967 the Commission on Atomic Weights did not meet but, in the interest of conserving travel monies, has transacted its business by mail. The consensus of the Commission is to recommend small changes in the atomic weights of two elements and the elimination of the previously stated limit of error on a third. The proposed changes are as follow:

	1967	1961
Neon	20.179 ± 0.003	20.183
Magnesium	24.305	24.312
Chromium	51.996	51.996 ± 0.001

These, like the changes recommended in 1965, are the results of "absolute" isotopic abundance measurements.

In the general review and recalculation of atomic weights which accompanied the change to the carbon-12 scale in 1961, the values assigned to a number of the elements were derived wholly or in part from chemical ratios involving silver and bromine. Because slight changes were made in the atomic weights for these two elements in 1965, the values of all elements that might be affected by the changes have been reexamined. None of the atomic weights thus recalculated is changed by as much as one unit in the last decimal place.

The Table of the Radioactive Elements has been reviewed and revised through the kindness of Dr KATHARINE WAY, Director of the Nuclear Data Project at the Oak Ridge National Laboratory and by Dr A.H. WAPSTRA of the Commission on Atomic Weights. Dr WAPSTRA has also reviewed the "Table of Selected Atomic Masses" and has recommended that no changes be made in it this year.

Discussion of recommended changes

Because silver, bromine and chlorine were key elements in the chemical determinations of atomic weights from which came most of the measurements prior to 1947, the atomic weights of these elements and the ratio of silver to chlorine and to bromine were carefully and thoroughly reviewed during the preparation of the 1961 Table. [Cf. A. E. CAMERON and EDWARD WICHES, *J. Am. Chem. Soc.* 84, 4175 (1962)]. At that time "absolute" mass spectrometric determinations of the isotopic abundance of silver and chlorine were available but only preliminary results were available for bromine. The Commission decided that it was premature to base the atomic weight of silver solely on the mass spectrometric determination without having available data for both bromine and chlorine. It was felt that the ratios of chlorine and bromine to silver were probably as accurate as any chemical measurements which had been made and that it would be desirable to compare these chemical ratios with the ratios calculated from the atomic weights of the three elements as determined by mass spectrometry. Accordingly, in the 1961 Table, the atomic weight of silver was chosen as 107.870 ± 0.003 , which was a value midway between the average of the recalculated chemical determinations, 107.871_4 , and 107.868_5 calculated from the mass spectrometric results of SHIELDS, CRAIG and DIBELER [1]. The uncertainty of ± 0.003 assigned to this number includes both chemical and physical determinations. The atomic weights of chlorine and bromine were tied to this atomic weight through the chemically determined ratios and the assigned uncertainty, ± 0.001 for chlorine and ± 0.002 for bromine reflected the uncertainty assigned to silver.

With the appearance in 1964 of the absolute value for the isotopic abundance ratio of bromine [2], the three elements could be considered together. The physically determined atomic weights of silver and of chlorine, 107.868 (accepting the value of SHIELDS, CRAIG and DIBELER [1]), and 35.453 give a calculated combining weight ratio, AgCl/Ag of 1.328667 which is exactly the pooled chemical combining ratio experimentally determined in the course of extensive work on atomic weight measurements. The atomic weight of bromine from the measurements reported by CATANZARO, MURPHY, GARNER and SHIELDS [2], 79.904 , gives a calculated combining weight ratio, AgBr/Ag of 1.740752 compared to the value of 1.740785 from chemical determinations. The difference of 19 parts per million indicates a bias in the chemical determination of this ratio which does not seem to have existed in the corresponding ratio involving chlorine.

The Commission agreed to abandon the chemical basis for the assignment of the atomic weights of these three elements and to base them upon the physically derived numbers. At the same time, the atomic weight of copper was changed from assignment on the basis of chemical determinations to the physical value of SHIELDS, MURPHY and GARNER [4]. Interestingly enough, their value adds only one more significant figure to the 1961 value but, of course, does permit applying a confidence limit.

The reviews of the elements are presented below in the form in which the element-by-element review was given in the 1961 Report of the International Commission on Atomic Weights [5].

At. No. 10 Neon: ^{20}Ne , ^{21}Ne , ^{22}Ne Atomic Weight 20.179 ± 0.003

The recommended atomic weight of neon for inclusion in the 1961 revision of the Table was 20.183. This was the value obtained by Prof. T. BATUECAS by recalculating the gas density measurements made by BAXTER and STARKWEATHER [6] (1928) and by BAXTER [7] (1928). The isotopic composition of atmospheric neon has been carefully redetermined in two laboratories by mass spectrometry using synthetic standards to correct for instrumental bias. EBERHARDT, EUGSTER and MARTI [8] (1965) prepared a standard by mixing atmospheric neon with ^{22}Ne of 99.7% isotopic purity. WALTON and CAMERON [9] (1966) mixed five standards from ^{20}Ne and ^{22}Ne of high isotopic and chemical purity. The isotopic composition reported by the two laboratories and the calculated atomic weights agree excellently. EBERHARDT, EUGSTER and MARTI found no difference in composition between commercially produced neon and samples which they recovered from the atmosphere by procedures which should have introduced no isotopic fractionation. WALTON and CAMERON found no differences within the precision of measurement in isotopic composition of several neon samples obtained from commercial sources. The calculated atomic weight, using the atomic masses from the compilation of MATTAUCH, THIELE and WAPSTRA [10] (1965) and the isotopic compositions determined in the two laboratories is 20.179 with a limit of error of ± 0.003 quoted by WALTON and CAMERON and originating mostly in the gas mixing for the preparation of the standards. EBERHARDT, EUGSTER and MARTI estimated their error as ± 0.002 . The Commission recommended the more conservative figure for inclusion in the Table.

At. No. 12 Magnesium: ^{24}Mg , ^{25}Mg , ^{26}Mg Atomic Weight 24.305

In the 1961 Table of Atomic Weights, the atomic weight of magnesium was based upon the isotopic composition reported by WHITE and CAMERON [11] (1948) and the atomic masses from the 1960 compilation of EVERLING, KÖNIG, MATTAUCH and WAPSTRA [12] (1960). CATANZARO, MURPHY, GARNER and SHIELDS [13] (1966) have determined the isotopic composition of naturally occurring magnesium by comparison with samples of known isotopic composition carefully prepared from nearly pure separated isotopes. CATANZARO and MURPHY report no detectable variations within the limit of error of the measurements in 60 samples of natural magnesium from various geological origins [14] (1966). With the isotopic composition reported and the masses from the recent compilation of MATTAUCH, THIELE and WAPSTRA [10] (1965), the calculated atomic weight is 24.30497 ± 0.00044 . The rounded value of 24.305 is recommended for inclusion in the Table and is stated without error.

At. No. 17 Chlorine: ^{35}Cl , ^{37}Cl Atomic Weight 35.453 ± 0.001

The atomic weight of chlorine, 35.453, recommended in the 1961 Table was derived from the atomic weight of silver through the silver chloride-silver

ratio determined chemically, and the uncertainty assigned to the number was derived from that assigned to silver.

The recommended small change in the atomic weight of silver makes no change in the atomic weight of chlorine stated to five significant figures. The validity of the AgCl/Ag ratio, 1.328667, from chemical atomic weight determinations and the accuracy of the atomic weight of chlorine are now supported by the "absolute" mass spectrometric measurements of the isotopic composition. SHIELDS, GARNER, MURPHY and DIBELER [3] (1962) give $^{35}\text{Cl} = 75.7705\%$ ($+0.0035$; -0.046) and $^{37}\text{Cl} = 24.2295\%$ ($+0.046$; -0.035) which with the masses from the compilation of MATTAUCH, THIELE and WAPSTRA [10] (1965) give a calculated atomic weight of 35.4527 ± 0.0007 . This was rounded to 35.453 ± 0.001 .

At. No. 24 Chromium: ^{50}Cr , ^{52}Cr , ^{53}Cr , ^{54}Cr Atomic Weight 51.996

The atomic weight recommended for inclusion in the 1961 revision of the Table was calculated from the isotopic composition of the element reported by FLESCH, SVEC and STALEY [15] (1960) with atomic masses from the compilation of EVERLING, KÖNIG, MATTAUCH and WAPSTRA [12] (1960).

FLESCH, SVEC and STALEY made their measurements upon a mass spectrometer which had been corrected for mass bias by calibration with known mixtures of separated nitrogen isotopes. Within the limits of error they found no variation in isotopic composition of chromium in 18 chromites of various geological origins.

In 1966 SHIELDS, MURPHY, CATANZARO and GARNER [16] redetermined the isotopic composition of chromium, calibrating the mass spectrometers with carefully prepared gravimetric standards mixed from separated chromium isotopes of very high chemical and isotopic purity. Abundances of the individual isotopes which they report were, in every case, within the limits of error of the FLESCH, SVEC and STALEY measurement. The atomic weight calculated from these abundances and the atomic masses from MATTAUCH, THIELE and WAPSTRA [10] (1965) is 51.99612 ± 0.00033 which rounds to precisely what has been appearing in the Table. The Commission recommends retaining the atomic weight of 51.996 but stating it without limit of error.

At. No. 29 Copper: ^{63}Cu , ^{65}Cu Atomic Weight 63.546 ± 0.001

The atomic weight of copper has been based upon chemical determinations by HÖNIGSCHMID and JOHANSEN [17] (1944) and RUER and BODE [18] (1924) since 1947. Their chemical ratios were recalculated for the 1961 revision of the Table of Atomic Weights and the atomic weight assigned was 63.54.

SHIELDS, MURPHY and GARNER [4] have made an absolute determination of the isotopic composition of copper. Mass spectrometer errors were eliminated by calibration with gravimetric standards prepared by mixing separated copper isotopes of high chemical and isotopic purity. With isotopic abundances of $^{63}\text{Cu} = 69.174 \pm 0.020$ and $^{65}\text{Cu} = 30.826 \pm 0.020$ and the atomic masses from the compilation of MATTAUCH, THIELE and WAPSTRA [10] (1965) the calculated atomic weight is 63.5455 ± 0.001 . Natural variations in the abundance ratio of the copper isotopes were investigated for 106 samples by SHIELDS, GOLDICH, GARNER and MURPHY [19]. The conclusion was that a microsample of a secondary copper mineral might show relatively large deviation, up to 9% of the ratio, but that bulk or commercially processed copper would show variations much less than this. The ± 0.001 -range of variation assigned to the atomic weight includes a very liberal allowance of $\pm 1.5\%$ of the isotopic ratio for this kind of copper.

At. No. 35 Bromine: ^{79}Br , ^{81}Br Atomic Weight 79.904 ± 0.001

The atomic weight recommended in the 1961 Table was 79.909 ± 0.002 , and was derived from the atomic weight of silver through the ratio AgBr/Ag which had been determined in the course of the extensive chemical work on atomic weights. The atomic weight of bromine calculated from the absolute abundances of the bromine isotopes, $^{79}\text{Br} = 50.686 \pm 0.047$ and $^{81}\text{Br} = 49.314 \pm 0.047$ atom percent, determined by CATANZARO, MURPHY, GARNER and SHIELDS [2] (1964) and the atomic masses from MATTAUCH, THIELE and WAPSTRA [10] (1965) is 79.904 ± 0.001 . The Commission now recommends this value. No provable variations were observed in the $^{79}\text{Br}/^{81}\text{Br}$ ratios of 29 commercial and natural samples. The AgBr/Ag ratio calculated from the atomic weights based on absolute mass spectrometric determinations is 1.740752 which differs by 19 parts per million from 1.740785 which was the value determined chemically.

At. No. 47 Silver: ^{107}Ag , ^{109}Ag Atomic Weight 107.868 ± 0.001

The atomic weight of silver which was recommended in the 1961 Table was midway between the average of recalculated chemical determinations and the atomic weight derived from the absolute mass spectrometric determination of the silver isotopic composition by SHIELDS, CRAIG and DIBELER [1] (1960). The absolute mass spectrometric results reported by CROUCH and TURNBULL [20] (1962) give an atomic weight 0.001 higher than SHIELDS, CRAIG and DIBELER's results and with an uncertainty of ± 0.0026 , which is twice that estimated by the latter workers.

The Commission now recommends that the atomic weight be assigned on the basis of the isotopic composition determined by SHIELDS, CRAIG and DIBELER [1]: $^{107}\text{Ag} = 51.818 \pm 0.052$; $^{109}\text{Ag} = 48.182 \pm 0.052$. From these abundances and the atomic masses from MATTAUCH, THIELE and WAPSTRA [10] (1965) the calculated atomic weight is 107.8685 ± 0.0013 . The rounded atomic weight of 107.868 ± 0.001 is recommended. SHIELDS *et al.* compared seven samples of native silver from various terrestrial sources to the commercial silver nitrate which they had chosen as a standard. One of the seven samples was statistically slightly different from the standard. Within the quoted limits of error there seems to be no significant variation in the isotopic composition of silver from various sources.

signed: GUÉRON

Bibliography

- 1 W. R. SHIELDS, D. N. CRAIG and V. H. DIBELER, *J. Am. Chem. Soc.* **82**, 5033 (1960).
- 2 E. J. CATANZARO, T. J. MURPHY, E. L. GARNER and W. R. SHIELDS, *J. Research Natl Bur. Standards*, **68A**, 593 (1964).
- 3 W. R. SHIELDS, T. J. MURPHY, E. L. GARNER and V. H. DIBELER, *J. Am. Chem. Soc.* **84**, 1519 (1962).
- 4 W. R. SHIELDS, T. J. MURPHY and E. L. GARNER, *J. Research Natl Bur. Standards*, **68A**, 589 (1964).
- 5 A. E. CAMERON and EDWARD WICHES, *J. Am. Chem. Soc.* **84**, 4175 (1962).
- 6 G. P. BAXTER and H. W. STARKWEATHER, *Proc. Nat. Acad. Sci.*, **14**, 50 (1928).
- 7 G. P. BAXTER, *J. Am. Chem. Soc.*, **50**, 603 (1928).
- 8 P. EBERHARDT, O. EUGSTER and K. MARTI, *Z. Naturforsch.*, **20a**, 623 (1965).
- 9 J. R. WALTON and A. E. CAMERON, *Z. Naturforsch.*, **21a**, 115 (1966).
- 10 J. H. E. MATTAUCH, W. THIELE and A. H. WAPSTRA, *Nuclear Physics*, **67**, 1 (1965).
- 11 J. R. WHITE and A. E. CAMERON, *Phys. Rev.*, **74**, 991 (1948).
- 12 F. EVERLING, L. A. KÖNIG, J. H. E. MATTAUCH and A. H. WAPSTRA, *Nuclear Physics*, **18**, 529 (1960).
- 13 E. J. CATANZARO, T. J. MURPHY, E. L. GARNER and W. R. SHIELDS, *J. Research Natl Bur. Standards*, **70A**, 453 (1966).
- 14 E. J. CATANZARO and T. J. MURPHY, *J. Geophys. Res.*, **71**, 1271 (1966).
- 15 G. D. FLESCHE, H. J. SVEC and H. G. STALEY, *Geochim. et Cosmochim. Acta.*, **20**, 300 (1960).
- 16 W. R. SHIELDS, T. J. MURPHY, E. J. CATANZARO and E. L. GARNER, *J. Research Natl Bur. Standards*, **70A**, 193 (1966).
- 17 O. HÖNIGSCHMID and R. JOHANNSEN, *Z. anorg. u. allgem. Chem.* **252**, 364 (1944).
- 18 R. RUER and K. BODE, *Z. anorg. u. allgem. Chem.*, **137**, 101 (1924).
- 19 W. R. SHIELDS, S. S. GOLDICH, E. L. GARNER and T. J. MURPHY, *J. Geophys. Research*, **70**, 479 (1965).
- 20 E. A. C. CROUCH and A. H. TURNBULL, *J. Chem. Soc.*, 161 (1962).

Table of Atomic Weights 1967

BASED ON THE ATOMIC MASS OF $^{12}\text{C} = 12$

The values for atomic weights given in the Table apply to elements as they exist in nature, without artificial alteration of their isotopic composition, and, further to natural mixtures that do not include isotopes of radiogenic origin.

Alphabetical Order in English

Name	Symbol	Atomic Number	Atomic Weight	Name	Symbol	Atomic Number	Atomic Weight
Actinium	Ac	89	.....	Indium	In	49	114.82
Aluminium	Al	13	26.9815	Iodine	I	53	126.9044
Americium	Am	95	.....	Iridium	Ir	77	192.2
Antimony	Sb	51	121.75	Iron	Fe	26	55.847 ^b
Argon	Ar	18	39.948	Krypton	Kr	36	83.80
Arsenic	As	33	74.9216	Lanthanum	La	57	138.91
Astatine	At	85	.....	Lawrencium	Lr	103	.....
Barium	Ba	56	137.34	Lead	Pb	82	207.19
Berkelium	Bk	97	.....	Lithium	Li	3	6.939
Beryllium	Be	4	9.0122	Lutetium	Lu	71	174.97
Bismuth	Bi	83	208.980	Magnesium	Mg	12	24.305
Boron	B	5	10.811 ^a	Manganese	Mn	25	54.9380
Bromine	Br	35	79.904 ^b	Mendelevium	Md	101	.....
Cadmium	Cd	48	112.40	Mercury	Hg	80	200.59
Calcium	Ca	20	40.08	Molybdenum	Mo	42	95.94
Californium	Cf	98	.....	Neodymium	Nd	60	144.24
Carbon	C	6	12.01115 ^a	Neon	Ne	10	20.179 ^b
Cerium	Ce	58	140.12	Neptunium	Np	93	.....
Cesium	Cs	55	132.905	Nickel	Ni	28	58.71
Chlorine	Cl	17	35.453 ^b	Niobium	Nb	41	92.906
Chromium	Cr	24	51.996	Nitrogen	N	7	14.0067
Cobalt	Co	27	58.9332	Nobelium	No	102	.....
Copper	Cu	29	63.546 ^a	Osmium	Os	76	190.2
Curium	Cm	96	.....	Oxygen	O	8	15.9994 ^a
Dysprosium	Dy	66	162.50	Palladium	Pd	46	106.4
Einsteinium	Es	99	.....	Phosphorus	P	15	30.9738
Erbium	Er	68	167.26	Platinum	Pt	78	195.09
Europium	Eu	63	151.96	Plutonium	Pu	94	.....
Fermium	Fm	100	.....	Polonium	Po	84	.....
Fluorine	F	9	18.9984	Potassium	K	19	39.102
Francium	Fr	87	.....	Praseodym.	Pr	59	140.907
Gadolinium	Gd	64	157.25	Promethium	Pm	61	.....
Gallium	Ga	31	69.72	Protactinium	Pa	91	.....
Germanium	Ge	32	72.59	Radium	Ra	88	.....
Gold	Au	79	196.967	Radon	Rn	86	.....
Hafnium	Hf	72	178.49	Rhenium	Re	75	186.2
Helium	He	2	4.0026	Rhodium	Rh	45	102.905
Holmium	Ho	67	164.930	Rubidium	Rb	37	85.47
Hydrogen	H	1	1.00797 ^a	Ruthenium	Ru	44	101.07

Name	Symbol	Atomic Number	Atomic Weight	Name	Symbol	Atomic Number	Atomic Weight
Samarium	Sm	62	150.35	Thorium	Th	90	232.038
Scandium	Sc	21	44.956	Thulium	Tm	69	168.934
Selenium	Se	34	78.96	Tin	Sn	50	118.69
Silicon	Si	14	28.086 ^a	Titanium	Ti	22	47.90
Silver	Ag	47	107.868 ^b	Tungsten	W	74	183.85
Sodium	Na	11	22.9898	Uranium	U	92	238.03
Strontium	Sr	38	87.62	Vanadium	V	23	50.942
Sulfur	S	16	32.064 ^a	Xenon	Xe	54	131.30
Tantalum	Ta	73	180.948	Ytterbium	Yb	70	173.04
Techneium	Tc	43	.....	Yttrium	Y	39	88.905
Tellurium	Te	52	127.60	Zinc	Zn	30	65.37
Terbium	Tb	65	158.924	Zirconium	Zr	40	91.22
Thallium	Tl	81	204.37				

^a Atomic weights so designated are known to be variable because of natural variations in isotopic composition. The observed ranges are:

Boron	±	0.003	Oxygen	±	0.0001
Carbon	±	0.00005	Silicon	±	0.001
Hydrogen	±	0.00001	Sulfur	±	0.003

^b Atomic weights so designated are believed to have the following experimental uncertainties:

Bromine	±	0.001	Iron	±	0.003
Chlorine	±	0.001	Neon	±	0.003
Copper	±	0.001	Silver	±	0.001

Table of Atomic Weights 1967

BASED ON THE ATOMIC MASS OF $^{12}\text{C} = 12$

The values for atomic weights given in the Table apply to elements as they exist in nature, without artificial alteration of their isotopic composition, and, further, to natural mixtures that do not include isotopes of radiogenic origin.

Order of Atomic Number

Atomic Number	Name	Symbol	Atomic Weight	Atomic Number	Name	Symbol	Atomic Weight
1	Hydrogen	H	1.00797 ^a	40	Zirconium	Zr	91.22
2	Helium	He	4.0026	41	Niobium	Nb	92.906
3	Lithium	Li	6.939	42	Molybdenum	Mo	95.94
4	Beryllium	Be	9.0122	43	Technetium	Tc	.....
5	Boron	B	10.811 ^a	44	Ruthenium	Ru	101.07
6	Carbon	C	12.01115 ^a	45	Rhodium	Rh	102.905
7	Nitrogen	N	14.0067	46	Palladium	Pd	106.4
8	Oxygen	O	15.9994 ^a	47	Silver	Ag	107.868 ^b
9	Fluorine	F	18.9984	48	Cadmium	Cd	112.40
10	Neon	Ne	20.179 ^b	49	Indium	In	114.82
11	Sodium	Na	22.9898	50	Tin	Sn	118.69
12	Magnesium	Mg	24.305	51	Antimony	Sb	121.75
13	Aluminium	Al	26.9815	52	Tellurium	Te	127.60
14	Silicon	Si	28.086 ^a	53	Iodine	I	126.9044
15	Phosphorus	P	30.9738	54	Xenon	Xe	131.30
16	Sulfur	S	32.064 ^a	55	Cesium	Cs	132.905
17	Chlorine	Cl	35.453 ^b	56	Barium	Ba	137.34
18	Argon	Ar	39.948	57	Lanthanum	La	138.91
19	Potassium	K	39.102	58	Cerium	Ce	140.12
20	Calcium	Ca	40.08	59	Praseodym.	Pr	140.907
21	Scandium	Sc	44.956	60	Neodymium	Nd	144.24
22	Titanium	Ti	47.90	61	Promethium	Pm	.....
23	Vanadium	V	50.942	62	Samarium	Sm	150.35
24	Chromium	Cr	51.996	63	Europium	Eu	151.96
25	Manganese	Mn	54.9380	64	Gadolinium	Gd	157.25
26	Iron	Fe	55.847 ^b	65	Terbium	Tb	158.924
27	Cobalt	Co	58.9332	66	Dysprosium	Dy	162.50
28	Nickel	Ni	58.71	67	Holmium	Ho	164.930
29	Copper	Cu	63.546 ^a	68	Erbium	Er	167.26
30	Zinc	Zn	65.37	69	Thulium	Tm	168.934
31	Gallium	Ga	69.72	70	Ytterbium	Yb	173.04
32	Germanium	Ge	72.59	71	Lutetium	Lu	174.97
33	Arsenic	As	74.9216	72	Hafnium	Hf	178.49
34	Selenium	Se	78.96	73	Tantalum	Ta	180.948
35	Bromine	Br	79.904 ^b	74	Tungsten	W	183.85
36	Krypton	Kr	83.80	75	Rhenium	Re	186.2
37	Rubidium	Rb	85.47	76	Osmium	Os	190.2
38	Strontium	Sr	87.62	77	Iridium	Ir	192.2
39	Yttrium	Y	88.905	78	Platinum	Pt	195.09

Atomic Number	Name	Symbol	Atomic Weight	Atomic Number	Name	Symbol	Atomic Weight
79	Gold	Au	196.967	92	Uranium	U	238.03
80	Mercury	Hg	200.59	93	Neptunium	Np	.....
81	Thallium	Tl	204.37	94	Plutonium	Pu	.....
82	Lead	Pb	207.19	95	Americium	Am	.....
83	Bismuth	Bi	208.980	96	Curium	Cm	.....
84	Polonium	Po	.....	97	Berkelium	Bk	.....
85	Astatine	At	.....	98	Californium	Cf	.....
86	Radon	Rn	.....	99	Einsteinium	Es	.....
87	Francium	Fr	.....	100	Fermium	Fm	.....
88	Radium	Ra	.....	101	Mendelevium	Md	.....
89	Actinium	Ac	.....	102	Nobelium	No	.....
90	Thorium	Th	232.038	103	Lawrencium	Lr	.....
91	Protactinium	Pa	.....			

^a Atomic weights so designated are known to be variable because of natural variations in isotopic composition. The observed ranges are:

Hydrogen	±	0.00001	Oxygen	±	0.0001
Boron	±	0.003	Silicon	±	0.001
Carbon	±	0.00005	Sulfur	±	0.003

^b Atomic weights so designated are believed to have the following experimental uncertainties:

Neon	±	0.003	Copper	±	0.001
Chlorine	±	0.001	Bromine	±	0.001
Iron	±	0.003	Silver	±	0.001

RADIOACTIVE ELEMENTS

Alphabetical Order

Name	Symbol	Atomic Number	Isotope	Half Life	Mode of Disintegration
Actinium	Ac	89	227	21.8y	α , β -
Americium	Am	95	243	7.95×10^3 y	α
Astatine	At	85	210	8.3h	α , e.c.
Berkelium	Bk	97	247	1.4×10^3 y	α
Californium	Cf	98	252*	2.65y	α , fission
Curium	Cm	96	247	1.6×10^7 y	α
Einsteinium	Es	99	254	270d	α
Fermium	Fm	100	257	80d	α , fission
Francium	Fr	87	223	22m	α , β -
Lawrencium	Lr	103	256	45s	α
Mendelevium	Md	101	257	3.0h	α , e.c., fission (?)
Neptunium	Np	93	237	2.14×10^6 y	α
Nobelium	No	102	255	3.0m	α
Plutonium	Pu	94	244	8.2×10^7 y	α
Polonium	Po	84	210*	138.4d	α
Promethium	Pm	61	147*	2.62y	β -
Protactinium	Pa	91	231	3.44×10^4 y	α
Radium	Ra	88	226	1600y	α
Radon	Rn	86	222	3.82d	α
Technetium	Tc	43	99*	2.14×10^5 y	β -
Thorium	Th	90	232	1.41×10^{10} y	α
Uranium	U	92	238	4.5×10^9 y	α

This table lists selected isotopes of the chemical elements, whether occurring in nature or known only through synthesis, that are commonly classed as radioactive. The listed isotope is the one of longest known half-life, or, for those marked with an asterisk, a better known one.

RADIOACTIVE ELEMENTS

Order of Atomic Number

Atomic Number	Name	Symbol	Isotope	Half Life	Mode of Disintegration
43	Technetium	Tc	99*	$2.14 \times 10^5 \text{y}$	β^-
61	Promethium	Pm	147*	2.62y	β^-
84	Polonium	Po	210*	138.4d	α
85	Astatine	At	210	8.3h	α , e.c.
86	Radon	Rn	222	3.82d	α
87	Francium	Fr	223	22m	α , β^-
88	Radium	Ra	226	1600y	α
89	Actinium	Ac	227	21.8y	α , β^-
90	Thorium	Th	232	$1.41 \times 10^{10} \text{y}$	α
91	Protactinium	Pa	231	$3.44 \times 10^4 \text{y}$	α
92	Uranium	U	238	$4.5 \times 10^9 \text{y}$	α
93	Neptunium	Np	237	$2.14 \times 10^6 \text{y}$	α
94	Plutonium	Pu	244	$8.2 \times 10^7 \text{y}$	α
95	Americium	Am	243	$7.95 \times 10^3 \text{y}$	α
96	Curium	Cm	247	$1.6 \times 10^7 \text{y}$	α
97	Berkelium	Bk	247	$1.4 \times 10^3 \text{y}$	α
98	Californium	Cf	252*	2.65y	α , fission
99	Einsteinium	Es	254	270d	α
100	Fermium	Fm	257	80d	α , fission
101	Mendelevium	Md	257	3.0h	α , e.c., fission (?)
102	Nobelium	No	255	3.0m	α
103	Lawrencium	Lr	256	45s	α

This table lists selected isotopes of the chemical elements, whether occurring in nature or known only through synthesis, that are commonly classed as radioactive. The listed isotope is the one of longest known half-life, or, for those marked with an asterisk, a better known one.

III. ORGANIC CHEMISTRY DIVISION

Report on the activity including the XXIVth Conference

Since the Paris Conference in July 1965 the main attention has been focussed on the realization of different symposia. The following took place under the sponsorship of IUPAC:

(1) 4th International Symposium on the Chemistry of Natural Products, Stockholm (Sweden), 26 June – 2 July 1966.

(2) International Symposium on Free Radicals in Solution, Ann Arbor (USA), 21–24 August 1966.

(3) 2nd International Symposium on Photochemistry, Enschede (Netherlands), July 1967.

(4) Symposium on Corrins, Nottingham (UK), 17–19 July 1967.

(5) 3rd International Symposium on Organometallic Chemistry, Munich (Germany), 28 August–2 September 1967 (jointly sponsored by the Inorganic Chemistry Division).

Almost all symposia found wide international response.

At the Prague Conference the Division Committee had two meetings and an open meeting. The Committee feels that the Organic Chemistry Division at present could best serve the interests of organic chemists the world over by promoting a variety of symposia. The number of Commissions should be kept as small as possible. Therefore financial aid should be given to the organizers of symposia suggested by the Division.

It was noted that sponsorship has been granted already for the following symposia:

(1) 5th International Symposium on the Chemistry of Natural Products, London (UK), July 1968.

(2) 2nd International Symposium on Pharmaceutical Chemistry, Münster (Germany), July 1968.

The following symposia are recommended:

(1) Valence Tautomerism, Karlsruhe (Germany), September 1968, Prof. R. CRIEGEE, Technische Hochschule Karlsruhe.

(2) Cycloaddition, München (Germany) 1969 or 1970, Prof. R. Huisgen, University of München.

The original suggestion was for a joint symposium, but the area to be covered is too much for one symposium.

(3) 6th International Symposium on the Chemistry of Natural Products, Moscow (USSR) 1970.

(4) Sponsorship should be given to the next International Symposium on Carbohydrate Chemistry, Paris (France) 1968 or later.

(5) A symposium on Liquid Crystals is under consideration.

(6) Hope is expressed that regular symposia to be organized every second year on Reaction Mechanisms. Proposals as to where the first symposium of this kind could be held will be welcome.

The Commission on Nomenclature of Organic Chemistry(III.1)

under the Chairmanship of Prof. VERKADE, to whom we owe a great debt for the magnificent work done, explained to the Committee in detail the present state of the work. He also expressed his desire to be discharged in a few years from his duties and he pointed out the fact that the necessity of stability in the membership of the Commission will now have to be balanced with the necessity of rejuvenating it. The Division Committee approved Prof. VERKADE's proposal to include in the near future in the Commission as associate members or observers such young specialists in nomenclature as can be found ready to cooperate in this arduous task in order to prepare for the extensive changes in membership which might be necessary as soon as section D (coordination compounds, inorganic chains and rings, metal-organic compounds, derivatives of P, As, Si and B) and section E (basic stereochemical nomenclature) are finished. It is hoped this will take place in 1969 or a little later. The Division Committee approved the changes in the Commission proposed by Prof. VERKADE.

The Division Committee noted that the Council has decided to put under its responsibility the joint IUPAC/IUB *Commission on Biochemical Nomenclature* after the dissolution of the Biochemistry Division.

The Commission on Chemical Plant Taxonomy (III.2)

was formed last year under the Chairmanship of Prof. L. MARION. It started work in the meantime. Problems related to the publication of chemotaxonomic results are being considered as well as work on recommendations for the deposition of specimens in connection with publications.

A proposal for a Commission on Carbohydrate Chemistry was discussed and rejected. But the Division Committee is in favour of giving sponsorship to International Symposia on Carbohydrate Chemistry. A proposal for a *Section on Medicinal Chemistry* (Chimie thérapeutique) by Prof. J.-A. GAUTIER, Faculté de Pharmacie, Paris, was discussed. It is recommended that an *Ad-hoc* Commission consisting of three persons for the study of the tasks of the section should be appointed. Since industry has a very great interest in Medicinal Chemistry the appointment of Prof. P. A. PLATTNER, F. Hoffmann-La Roche, Basel, as Chairman of the *Ad-hoc* Commission is proposed. Furthermore, Prof. P. D. BARTLETT suggested a *Commission on Organic Photochemistry*. Also in this case an *Ad-hoc* Commission under the chairmanship of Prof. G. HAMMOND, Pasadena, to study the tasks to be undertaken, should be appointed. At the next Conference it will be decided whether or not the proposed Section and Commission be formed.

Again methods of publication were discussed. No practical proposals came out either from the discussion or from the comments received on suggestions made earlier (Information Bulletin, No. 25).

F. WEYGAND

V. ANALYTICAL CHEMISTRY DIVISION

Short Report of the President

(IUPAC Conference Prague 1967 Item 10)

The various Commissions of the Analytical Chemistry Division have all been active since the XXIIIrd Conference of IUPAC held in Paris in July, 1965. The activities of Commission 1 on Analytical Reactions and Reagents have been temporarily suspended as an expediency to permit the organization of effort that has been required due to the cooperation of IUPAC with the United Nations and other agencies. The most important cooperative effort to date has been at the request of the Common Market (CEE). This program was initiated to elaborate methods of analysis for the control of criteria of purity of food additives. The Analytical Chemistry Division had served in a consultative capacity working closely with the Applied Chemistry Division through a special Committee consisting of Professor R. TRUHAUT (Chairman), Lord TODD (Vice-Chairman), Professor PHILIP W. WEST and Dr. R. MORE. Other cooperative programs are anticipated; and as soon as the scope and depth of such activities can be evaluated, it is hoped that a special Commission of the Division can be created and the normal activities of Commission 1 can be resumed.

Commission 2 dealing with Microchemical Techniques has published a number of reports and a study on the accuracy of C-H determinations has been completed. A study dealing with the sources of errors is currently in progress. Commission 3 has submitted in final form, reports dealing with (a) Nomenclature for Titrimetric Analysis, (b) Presentation of Results for Chemical Analyses, (c) List of Terms for Mechanization, and (d) a Commission Report on Liquid-Liquid Extraction. Commission 4 dealing with Spectrochemical and Other Optical Procedures for Analyses is currently engaged in the compilation of numerical values for detection limits in emission spectroscopy. It is anticipated that members of the Commission will also serve in advisory capacities in the revision of wavelength tables. The English version of a report dealing with nomenclature, symbols and usage in analytical emission spectroscopy has been submitted for approval and publication. Commission 5 on Electroanalytical Chemistry has completed the compilation of the dissociation constants of inorganic acids and bases in aqueous solution. Important studies of acids, bases and salts by EMF, conductance, optical and kinetic methods are under way and follow an earlier report dealing with the practical measurement of pH in amphiprotic and mixed solvents. Reports have been prepared on the purification of important solvents. Also under way is the compilation of polarographic half-wave potentials as well as a project dealing with electrode potentials in non aqueous media.

Commission 6 on Equilibria Data has provided an authoritative and comprehensive compilation of equilibrium constant data. The first compilation was published in 1958 and has been kept on a current basis since that time. Current activities involve the critical review of stability constants so that recommended values of equilibrium constants can be provided for the guidance of the chemical community. The newly created Commission 7 dealing with Analytical Radiochemistry and the Analysis of Nuclear Materials has not yet met, but four studies are already under way. These include (a) Purity of Commercial Radioactively Labeled Preparations, (b) Publicity for Radioactive Methods in Analytical Chemistry, (c) Innercomparison of Analytical Methods, and (d) Reference Materials for Activations Analysis.

Respectfully submitted,

Professor PHILIP W. WEST, President
Analytical Chemistry Division

Report of the Open Meeting of the Analytical Chemistry Division, Prague, 31 August 1967

(1) President's opening remarks

The Division President, Prof. P. W. WEST, welcomed the members of the Division to the Conference. He asked those present to stand in silence for a few moments in memory of two former Division Secretaries, Dr DEGENS and Prof. GORDON, who had passed away during the previous year.

Prof. WEST recalled the proud tradition of the Division, paying tribute to its earlier successful administration, and stated that its interests were continuously expanding. He stressed the importance of analytical chemistry which was not always recognized and cited the current interests in the determination of trace constituents in food, water and air. As examples of the Division's expanding interests, the cooperative programme with the European Economic Community and the proposal that Clinical Chemistry should become part of the Division's activities were quoted.

The President then announced the election of Prof. W. KEMULA as Vice-President (President Elect) for 1967-69 and welcomed the newly-elected Division Committee members, Proff. ALIMARIN, BELCHER, DUVAL and ERDEY. He expressed his gratitude, and that of the Division, to the retiring Committee members, Proff. BABKO, GAUTIER and MALISSA and Dr SMALES. Finally, he introduced the new Division Secretary, Mr FENNELL, to the members of the Division.

(2) Announcements by Secretary

The Secretary apologized for any shortcomings in the conduct of the Division's affairs since he took office earlier in the year. It had not been easy to take over during a Conference year. He asked that Commission Secretaries should submit the information required for inclusion in the Comptes Rendus as early as possible so that he could forward it to the Secretary General in good time.

(3) Nomination/Election rules

The draft new rules prepared by the 1965-67 N/E Committee were discussed. Some amendments were suggested for consideration by the Division Committee.

(4) Clinical Chemistry

The President outlined the reasons for the proposal that the former Commission IV.2, the Commission on Clinical Chemistry, should join the Analytical Chemistry Division.

(5) Cooperative Programmes

The President elaborated on the contract between the European Economic Community and IUPAC. From the outset, the work had departed from the usual form of IUPAC procedure and, owing to the loss of the services of Dr DEGENS, the project had had to be run on a day-to-day basis. Prof. WEST was himself on the IUPAC Committee dealing with the project under the Chairmanship of Prof. TRUHAUT, President of Division VI.

It had been planned to use the services of Commission V.1, suspending its traditional function, to comment on procedures recommended by Division VI. However, owing to the rate at which the work had to be done, it had not been possible to set up a working procedure.

Prof. WEST had now asked Prof. MALISSA, who as former Vice-President had a good knowledge of the problems, to reorganize Commission V.1 with the specific object of dealing with the EEC programme and it was hoped that a proper basis for the work would be established during the coming week to replace the present emergency basis. It was hoped that the major task of drafting standard procedures could be undertaken by the IUPAC Secretariat.

The President invited comments from Prof. VEIBEL, who stated that he knew that all members of Commission V.1 had been willing to assist in the EEC project and would have liked to have been present at Prague to help to form a joint Commission with members of Division VI. He reiterated that such a joint Commission should contain an organic chemist. Prof. VEIBEL asked the President that the former members of Commission V.1 should be informed of what had happened and why their services had not been required.

(6) *Other business*

There was no other business so the President thanked the members for their attendance and closed the meeting.

**Minutes of the Eleventh Meeting of the Analytical Chemistry
Division Committee, Prague, 30 and 31 August 1967**

Present: Prof. P. W. WEST (President), Prof. H. MALISSA (Vice-President), Prof. T. FUJINAGA, Prof. J. A. GAUTIER, Prof. D. N. HUME, Prof. H. KAISER, Prof. W. KEMULA, Dr A. A. SMALES, Mr R. W. FENNELL (Secretary); Prof. I. P. ALIMARIN, Prof. R. BELCHER and Prof. L. ERDEY as Observers.

(1) President's opening remarks

The President first paid tribute to the late Dr DEGENS and emphasized the great loss suffered both by the Division and by IUPAC in his untimely death.

Prof. WEST said that there was a feeling of importance within the Division which ran smoothly and produced good reports. He was indebted to his predecessors for handing over to him an efficient organization.

There was now a broadening of the Division's activities in that it was taking part in cooperative programmes with other organizations, bringing with them special jobs of an applied nature. The first cooperative programme was concerned with the European Economic Community. Prof. WEST was a member of the IUPAC Committee chaired by Prof. TRUHAUT, President of Division VI.

The Division had also been asked to expand by incorporating the former Commission on Clinical Chemistry of Division IV. This, the Division of Biological Chemistry, had been dissolved.

(2) Report of the 10th Division Meeting

The report of the 10th Division Committee Meeting (Paris, 1965) was accepted as a true record.

(3) Election of Division Committee Members

(3.1) Report of the Nomination/Election Committee 1965-67

Prof. GAUTIER, Chairman, presented the reports of the N/E Committee for the elections of Secretary and of four Committee Members (see p. 51). Prof. GAUTIER pointed out that there was a lack of precision in the Division's current election rules and that the N/E Committee had prepared a more precise set of rules.

The reports of the Committee were accepted with gratitude.

(3.2) Election of N/E Committee 1967-69

The N/E Committee 1967-69 was elected as follows: Dr P. ZUMAN (Chairman), Prof. D. N. HUME, Dr A. A. SMALES.

(3.3) Election of Vice-President 1967-69

It was proposed by the President, seconded by Prof. MALISSA, that Prof. KEMULA should be elected Vice-President (President Elect) for 1967-69. Prof. KEMULA left the room while his candidature was discussed and the Committee elected him with acclamation.

(4) Amendments to the Rules

(4.1) Nomination/Election Rules

The proposed new rules prepared by the 1965-67 N/E Committee, after being discussed at the Open Meeting of the Division, were considered in detail by the Division Committee.

Several amendments, duly proposed, seconded and carried, were made to the draft; the finalized version will be circulated.

(4.2) *Publication of Reports*

The Secretary was given authority to try to set out, after consultation with the Secretary General, an exact procedure for publication of Commission Reports for incorporation, after approval by the Division Committee, into the Division Rules.

(5) *Report of the Ad-hoc Committee on Nomenclature in Analytical Separation Processes*

Prof. HUME stated that a report had been prepared and circulated to Division members. A meeting of the Division on 29 August had achieved a remarkable degree of agreement. A further informal meeting of Commissions V.3 and V.6 was to be held. He recommended a continuation of the work to include dynamic separation processes. Prof. MALISSA advised close liaison with the Physical Chemistry Division on this aspect.

It was pointed that no budgetary allowance had been made for this Committee but, in view of the success of the group, a request for funds to support a meeting in 1968 should be made.

(6) *Report of the Working Committee on Teaching in Analytical Chemistry*

Prof. HUME regretted that he had not written the report. He had found, after close study of the information available to him, that the reports from individual countries indicated such widely separated opinions that a summary report was not possible.

Following discussion, it was proposed by Dr SMALES, seconded Prof. MALISSA, that Prof. HUME should write a short report summarizing his thoughts on the problem and attach it to the collection of individual reports. The President should then forward the reports to the IUPAC Committee on Teaching of Chemistry with a covering letter suggesting representation on the Committee by a member of the Analytical Chemistry Division. A statement on the problem of the teaching of analytical Chemistry should also appear in the President's report to Council.

This resolution was carried unanimously.

(7) *Report of the Ad-hoc Committee on Purity of Laboratory Chemicals*

The Committee recommended in the report that IUPAC should take no action on the general problem of international standardization of laboratory chemicals. Appropriate Divisions of IUPAC should attend to problems associated with purity of solvents and reagents of purely scientific, as distinct from trade, interest and should specify minimal purity requirements for reagents specified in standard test methods. It was not clear how IUPAC, or any other organization, might handle standardization for international trade purposes because of the varied national and commercial interests concerned.

It was proposed by Dr SMALES, seconded Prof. HUME, and agreed that the report be accepted but not published.

(8) *Reports from Commissions*

(8.1) *Commission V.2*

"A study of the accuracy and precision of methods for the determination of carbon and hydrogen." Approval of this report must await submission of the tables and illustrations.

(8.2) *Commission V.3*

- 8.2.1 "Recommendations for the presentation of the results of chemical analysis." Report approved.
- 8.2.2 "Sodium carbonate as a primary standard in acid-base titrimetry." Report approved.
- 8.2.3 "Recommended terminology of liquid-liquid distribution." Report approved in principle subject to emendation to bring terms and symbols into line with the recommendations of the *Ad-hoc* Committee on Nomenclature in Analytical Separation Processes.
- 8.2.4 "Recommended terminology for automation, etc." Report withdrawn by the Commission for further study.
- 8.2.5 "Recommended terminology for titrimetric analysis." Report approved.
- 8.2.6 "Sulphamic acid as a primary standard in acid-base titrimetry." This report, submitted at short notice, was approved in principle subject to postal confirmation by the Division Committee.

(8.3) *Commission V.4*

"Nomenclature, symbols and usage in analytical atomic spectroscopy (Part I)." As a result of preliminary circulation, this report had been found to be in conflict with the Recommendations of ISO/TC 12. The Commission was finalizing a new draft report which would be circulated to the Inter-divisional Committee on Nomenclature and Symbols and to Commissions I.1 and V.3 and then published in the Information Bulletin.

(8.4) *Commission V.5*

- 8.4.1 "Classification on nomenclature of electroanalytical methods." Report approved.
- 8.4.2 "A proposal for the practical measurement of pH in amphiprotic and mixed solvents." Report approved.

(8.5) *Commission V.6*

"Recommended symbols for solution equilibria." Report approved.

(9) *Budget*

Owing to shortage of time for detailed discussion of this item, it was proposed by Prof. HUME, seconded Prof. KAISER, and carried that the Executive Committee of the Division should be empowered to finalize budgetary allocations for the Division for 1968.

(9.1) *Commission Meetings, 1968*

Commissions V.3, V.5 and V.7 had requested approval for meetings during 1968. The *Ad-hoc* Committee on Nomenclature in Analytical Separation Processes also wished to meet during 1968.

(9.2) *Administrative Expenses*

Commission Secretaries would be invited by the Secretary General to submit claims for 1967, and for 1966 if not already settled, towards the end of the year. Allocations for extraordinary expenditure would be decided by the Division Executive Committee.

(9.3) *Sponsorship of Symposia*

- 9.3.1 *III Analytical Conference, Warsaw, 1968.*—IUPAC sponsorship had been given. Financial support was being negotiated.

- 9.3.2 *International Symposium on Analytical Chemistry, Birmingham, 1969 or 1970.*—IUPAC sponsorship had been given. It was hoped that a date could be arranged so that this symposium was not held too near the date of the symposium at Graz (see 9.3.3).
- 9.3.3 *6th International Symposium on Microchemical Techniques, Graz, 1970.*—IUPAC sponsorship had been given.
- 9.3.4 *International Congress on Analytical Chemistry, Japan, 1972.*—Prof. FUJINAGA explained that he wished to get the feeling of the Committee, well in advance of a formal proposal, as to whether the Division might support the Congress. The Japanese Society were already reserving finances. The Committee expressed its appreciation of the advance information and felt that there was a strong possibility that IUPAC sponsorship would be supported by the Division when details were known.

(10) *Programmes of Commissions*

(10.1) *Commission Progress Reports*

The progress made in projects since 1965 and the future programmes submitted by Commissions V.2 to V.7 were approved.

A proposal to change the name of Commission V.2 to "Commission on Microchemical Techniques and Trace Analysis" in order to reflect the expanded programme of the Commission was approved.

(10.2) *Membership of Commissions*

The Committee approved the proposed membership of Commissions as submitted by the Commission Secretaries.

(11) *Cooperation with other International Agencies*

The role of the Division in the IUPAC programme of cooperation with other international agencies was referred to in the President's opening address to the Division Committee and at the Open Meeting. No time was available for detailed discussion by the Division Committee.

(12) *International Laboratory for Analytical Chemistry*

Dr MERTEN, of the International Atomic Energy Agency, had spoken to some members of the Division Committee but there was no time to discuss this item at the Division Committee meeting. The President will appoint a committee to examine the proposal.

(13) *Division of Biological Chemistry, Commission on Clinical Chemistry*

Division IV had been dissolved and it had been recommended by the Exeutive Committee of IUPAC that the former Commission IV.2 should be absorbed as a Section in Division V.

Dr M. C. SANZ explained the function of the Clinical Chemistry Commission and its relationship with the International Federation of Clinical Chemistry. It was proposed that the Section in the Analytical Chemistry Division would consist of 3 Commissions, including some members of the Federation. The total IUPAC membership would be 10. The Commissions would deal with:—1 Units and Quantities—2 Teaching—3 Automation.

The Division Committee discussed the matter in considerable detail. Whilst the Division would welcome an expansion of its interests into the field of clinical chemistry and both parties should gain by closer contact,

there seemed to be no reason why at this stage the Clinical Chemists should enter the Division as a Section. On the basis of the knowledge available to the Committee, the activities of the proposed Section would be no wider than those of existing Commissions within the Division. Further, it seemed inappropriate, under Section 10.4 of the Statutes of the Union, that Section status should be afforded to any group within the Division without the approval of the Division Committee.

The following resolution, proposed by Dr SMALES, seconded by Prof. KAISER, was carried unanimously:

The Analytical Chemistry Division Committee proposes that the Division President should ask Council to accept that the former Commission IV.2 should become Commission V.8 within the Analytical Chemistry Division.

Place and date: Prague, 30–31 August 1967

Present: Dr W. SCHÖNIGER (Chairman), Dr R. LÉVY (Secretary), Dr N. E. GEL'MAN (Titular Member), Prof. Dr H. FLASCHKA (Titular Member), Prof. Dr W. KOCH (Titular Member), Prof. Dr M. VEČEŘA (Titular Member), Ing. J. KÖRBL (Associate Member), Dr A. M. G. MACDONALD (Associate Member).

Part time: Prof. P. W. WEST (Division President), Prof. K. L. CHENG (Associate Member), Prof. Dr H. MALISSA (Associate Member), Prof. Dr H. SPITZY (invited observer).

Excused: Dr AL STEYERMARK (Titular Member).

The following items were discussed:

(1) *Current projects*

1.1 *Study on the Accuracy and Precision of Methods for the Determination of Carbon and Hydrogen in Organic Compounds (Project leader: Prof. VEČEŘA)*

The new report which has taken into account the recommendations of Prof. FIEBER concerning the statistical study of analytical results was received by the Commission on November 1966. This Czech version has been translated into English under the supervision of Dr MACDONALD. The translation was forwarded in June 1967 by the Commission Chairman to the Division Executive Committee (which had accepted already the preceeding report in its principle) and to the Commission members.

This rewritten report has been discussed thoroughly by the Commission and finally accepted. The corrected version will be submitted to the Division Committee for final approval with the request to provide publication.

1.2 *Study on the Sources of Errors in Elementary Organic Microanalysis. (Project leader: Dr LÉVY)*

This study has been delayed considerably due to several difficulties, namely a) A large number of reports were written in Russian and had to be translated; b) at the XXIIIrd Conference in Paris it has been decided that in order to have a real international participation a new invitation in the proper journals should be published; c) the high number of reports (111*) which had to be critically examined by the Project leader alone.

The draft of the final report is divided into 11 chapters, 8 of which are ready and include 164 typed pages with double-line spacing.

In order to help the project leader, the Commission decided to have the draft examined critically by the other members concerned so as to discuss the reported items and possibly to make the report lighter.

1.3 *Study on the Accuracy and Precision of the Determination of Fluorine in Organic Compounds. (Project leader: Miss Dr A. M. G. MACDONALD)*

The first project leader, Dr STEYERMARK, resigned due to poor health. Consequently the new Commission member, Miss Dr MACDONALD, took over and started the work after the Paris Conference.

41 microanalysts from various countries have cooperated, using 43 different techniques of fluorine determination. Dr MACDONALD considers

* France 19, India 1, Italy 3, Israel 1, Democratic Republic Germany 1, Federal Republic Germany 2, Japan 6, The Netherlands 8, Poland 1, Switzerland 7, UK 14, USA 14, USSR 34.

that more comparable results have to be available before being able to draw any conclusions.

The Commission agreed unanimously to this view point and asked Dr MACDONALD to continue. A selected number of the co-workers will be asked to analyze a new series of samples.

1.4 *Study on Mass Absorption Coefficients Used in Electron Beam Microanalysis. (Project leader: Prof. MALISSA)*

After hearing Prof. MALISSA on the project status, the following has been decided: It has to be examined by the project leader and Prof. W. KOCH, if the "Tables of X-Ray Mass Absorption Coefficients" published by THEISSEN and VOLLATH can be used as a basis for preliminary IUPAC recommendation. For this purpose the Analytical Division is asked to obtain the cooperation of two members of the Division on Physical Chemistry.

1.5 *Study on the Purification of Chemicals Used for Micro and Trace Analysis. (Project leader: Prof. FLASCHKA)*

After hearing Prof. FLASCHKA on the difficulties he met when looking for collaborators, it was decided that he will cooperate with the newly elected member who is a specialist in trace analysis.

1.6 *Study on the Accuracy and Precision of the Determination of Nitrogen (according to DUMAS) in Organic Compounds. (Project leader: Prof. VEČEŘA)*

Prof. VEČEŘA was asked to start this project which has been already approved by the Division Executive Committee and only been postponed.

After a long discussion the following basic procedure has been adopted, which should also be used for future comparative studies in which experimental work is involved.

The study will be divided in two parts:

A. A questionnaire will be sent out to known microanalysts to get as fast as possible detailed informations (e.g. sample scale, method used, test compounds used, etc.) on the method to be studied. At the same time the study will be announced in the proper journals.

B. A group of microanalysts selected through evaluation of the answers given on the questionnaire, will do the experimental work in order to get comparable results.

In the future such a modus operandi will be used for similar new projects of the Commission.

(2) *New projects*

The Commission adopted two new projects for which the approval of the Division Committee is asked.

2.1 *Project of a Study on the Accuracy and Precision of Carbon and Hydrogen Determinations in Organic Compounds Containing Hetero Elements.*

This project should be a continuation of study 1.1 which was restricted to organic compounds containing no other elements but iodine, sulphur, fluorine and phosphorus with no special problems related to the presence of these elements. The study will include two steps according to the decision given 1.6 in.

The Commission appointed Dr N. E. GEL'MAN, USSR, as a project leader.

2.2 *Project of a Study on the Accuracy and Precision of the Determination of Metals in Organic Compounds Excluding Simple Residue Procedures.*

This study will also be conducted according to the principle laid down under 1.6; Ing. KÖRBL, ČSSR, is the project leader.

(3) *Enlargment of the Commission*

Taking into consideration that trace analysis becomes more and more important and that this branch of Analytical Chemistry is not represented in the Division on Analytical Chemistry at all the Commission has unanimously decided that approval should be asked for widening the scope of the Commission on Microchemical Techniques by including Trace Analysis. The President of the Division was present during this discussion and welcomed the decision.

The new name of the Commission V.2 shall be from now on:

“Commission on Microchemical Techniques and Trace Analysis”

“Commission des Méthodes microchimiques et de l'Analyse des Traces”

(4) *Elections* (see page 52).

V.3 Minutes of Meetings of the Commission on Analytical Nomenclature

Place and date: Prague, 30 and 31 August 1967

Present: Prof. R. BELCHER (Chairman), Prof. T. S. WEST (Secretary), Dr D. AMBROSE, Prof. E. BAYER, Mr R. W. FENNEL, Prof. W. FISCHER, Prof. H. M. N. H. IRVING, Prof. E. B. SANDELL, Prof. I. P. ALIMARIN (Associate Member), Prof. O. SAMUELSON (Associate Member).

All Commission members were present; there were no apologies for absence. Three meetings were held.

The minutes of the meeting held in London, 6th December 1966, were approved.

(1) *Liquid-liquid Extraction*

Following the extensive discussion of the open meeting called by the *Ad-hoc* working group on the nomenclature of separation processes on 29 August, the report on liquid-liquid distribution was discussed extensively and several changes of detail were accepted in order to bring the report into agreement with the views expressed at the previous meeting. Amongst these were the use of the word "distribution" in place of "extraction", replacement of "Partition Coefficient P " by "Distribution Constant K_D ", substitution of the term "Distribution Ratio D " by "Concentration Distribution Ratio D_c " and renaming "Separation Factor S " as "Enrichment Factor S ". A term for Mass Distribution Ratio D_m was also to be included. Prof. IRVING was invited to redraft the report accordingly.

(2) *Titrimetric Analysis*

This report, which was discussed extensively in London on 6 December in the light of comments from other Commissions and other outside parties, had been passed to the Division Committee in March 1967. There was no further discussion of this report.

(3) *Presentation of Results*

This report, which was discussed in London on 6 December in the light of some comments received from other Commissions and private individuals, had been passed to the Division Committee in March 1967 for ratification. It was not discussed further.

(4) *Mechanisation and Automation*

Some discussion took place concerning this report which had already been submitted to the Division Committee for ratification. Some alterations were decided on even if the report was ratified in its present form.

(5) *Ion Exchange*

A paper presented by Professors BAYER and SAMUELSON was discussed and approved with only minor changes. The amended report was to be circulated to Commission members and then to other Commissions for comments before the next meeting of the Commission.

(6) *Primary Standards*

(a) *Sodium Carbonate.* The Commission strongly recommends that the Division Committee accepts this report as it stands. The report was produced by a working group of the SAC. Prof. BELCHER will discuss the matter of publication of this report in Pure and Applied Chemistry with the SAC. (Society of Analytical Chemistry).

(b) *Sulphamic Acid*. A report produced by a working group of the SAC was considered and approved with minor changes. The Commission strongly recommends that the Division Committee accepts this report. This will be dealt with as in 6(a).

(7) *Interdivisional Committee on Nomenclature and Symbols*

The Chairman, who represents our Commission on the above committee, reported that he had received a document, "Terminology and Symbols in Colloid and Surface Chemistry". This was passed to Prof. SAMUELSON in connection with our report on chromatography. A further copy will be passed to the new members who would deal with the project on contamination phenomena.

At the request of the Interdivisional Committee (Paris, 1965) our Commission had undertaken a compilation of trivial names of reagents. Mr FENNELL had compiled a total of 300 index cards but was unable to continue owing to his new appointment as Division Secretary. The project is to be taken over by Prof. IRVING and Dr AMBROSE.

(8) *Chromatography*

The work continues and Prof. BAYER estimates that a report will be available in December 1967.

(9) *Future work of the Commission*

(a) *Contamination Phenomena*. It is well known that various types of contamination that occur during precipitation require classification. Much confusion exists in the literature. It is proposed that the Commission undertake this project. Dr E. BERG and Dr H. ZETTLER are to be asked to undertake the task.

(b) *Scales of Working*. Much confusion exists in defining various scales of working, e.g., what constitutes semi-micro, ultra-micro, sub-micro, trace analysis, etc. A previous project undertaken by the V.2 Commission had been abandoned. It is proposed that this project be undertaken in conjunction with a representative from V.2. The project leader was to be Prof. SANDELL. Other members of the working group were to be Dr O. MENIS and Prof. FLASCHKA (V.2).

(c) *Mass Spectrometry*. The Commission considered that there was need for standardization of nomenclature in this area. The project leader was to be Prof. BAYER associated with Prof. SAMUELSON and Dr K. BIEMANN.

(d) *Standard Substances*. Because the Commission had been allotted the task of dealing with acid-base primary standards, it was felt that further useful work could be undertaken in this field. For example, there is a need for a dependable standard in compleximetric titration. The working group will investigate the needs in other directions. The working group is Dr W. I. STEPHEN and Prof. R. P. LASTOVSKY.

(e) *Other Projects*. The chairman is to circulate Commission members with (i) Report on Concept of a Selectivity Index, (ii) Presentation of Analytical Methods for Publication. The Commission will consider these reports at its next meeting to decide on further action.

The proposed project on Atomic-Absorption and Atomic-Fluorescence Spectroscopy was abandoned because of the work being undertaken by V.4.

(10) *Next Meeting*

It was proposed to arrange for a meeting of European members in 1968. Time and place to be decided by the Chairman and Secretary.

T. S. WEST, Secretary

V.4 Minutes of Meetings of the Commission on Spectrochemical and Other Optical Procedures

Place and date: Prague, 29, 30 and 31 August 1967

Present: Prof. H. KAISER (Chairman), Prof. V. A. FASSEL (Secretary), Mr B. F. SCRIBNER, Dr K. M. BILLS (Associate Member), Mr A. KVALHEIM (Associate Member), Dr A. C. MENZIES (Associate Member), Dr E. PLSKO (Associate Member).

Five full meetings of the Commission were held, one on 29 August, and two each on 30 and 31 August.

(1) Reports

The nomenclature document discussed under 2 was circulated to various IUPAC Divisions and Commissions and to various national adhering bodies. Extensive comments were received as a result of this distribution. Many of these recommendations are being incorporated into the amended version.

(2) *Nomenclature, Symbols, and Usage in Atomic Spectrochemical Analysis*

Incorporation of amendments and preparation for printing of the document on "Nomenclature, Symbols, and Usage in Atomic Spectrochemical Analysis" is proceeding. The final document will be forwarded to the Chairmen of Commissions I.1 and V.3 for their study and approval on or before 15 December 1967.

(3) *Line Misidentifications in the "MIT Wavelength Tables"*

A compilation of approximately 600 reported misidentifications in the *MIT Wavelength Tables* is now available for distribution. In view of the University of Michigan's proposal on a revision of these Tables and other actions in the USA, the Commission intends to make this collection available for incorporation into the revision.

(4) *Minimum Concentrations Detectable*

A critical study of detection limits reported in the literature showed that reliable comparisons are not possible at this time, because the criteria for determining detection limits have not been on a rigorous basis. A new attempt will be made after concepts and procedures for establishing detection limits are properly standardized.

(5) *Extent of Application of Different Spectroscopic Techniques*

An inquiry into the use of different spectroscopic analytical techniques produced only indecisive results. This project has been discontinued.

(6) *Future Projects*

Continuation of document on "Nomenclature, Symbols, and Usage in Atomic Spectrochemical Analysis".

The following topics will be given primary consideration:

- a) Flame Atomic Absorption and Atomic Fluorescence Spectroscopy.
- b) X-Ray Fluorescence Spectroscopy, including X-Ray Electron Microprobe Techniques.
- c) Excitation Source Descriptions and Parameters.
- d) Terms and Concepts Related to Rigorous Determination of Detection Limits.

V. A. FASSEL (Secretary)

V.6 Minutes of Meetings of the Commission on Equilibrium Data

Place and date: Prague, 30 and 31 August 1967

Present: Dr F. J. C. ROSSOTTI (Secretary, acting Chairman), Prof. D. L. LEUSSING (Acting Secretary), Dr M. T. BECK, Prof. L. B. ROGERS, Prof. D. DYRSSEN (Associate Member), Prof. D. N. HUME (Associate Member).

(1) *Recommended Symbols for Solution Equilibria*

The tentative recommendations by SILLÉN and others (see Information Bulletin No. 26) were submitted for definite publication in Pure and Applied Chemistry with one amendment.

(2) *Nomenclature of Separation Methods*

Various amendments to the Interim Report of HUME's *Ad-hoc* Committee were suggested.

(3) *Recommended Terminology of Liquid-Liquid Extraction*

Recommendations in the tentative report by Commission V.3 (Information Bulletin No. 26) which were contradictory to recommendations in the reports under paras. 1 and 2 above were discussed with Commission V.3.

(4) *Tables of Stability Constants*

It was understood that MARTELL and SILLÉN were continuing their preparation of a supplement to the 2nd Edition. A number of errors and omissions had been noted in the Organic Ligands Section. Members of the Commission offered to give the compilers any assistance they required in preparing the Supplement and also in preparing a list of corrections to the 2nd Edition. It was also suggested that the compilers should indicate more widely values of constants of questionable accuracy.

(5) *Distribution and Solubility Constants*

DYRSSEN reported that less progress had been made on this project, but that it was now hoped to include constants for non-aqueous media. New elections to the Commission were made with a view to giving DYRSSEN, FREISER and MARCUS more assistance.

(6) *Ion-Exchange Equilibrium Constants*

A draft submitted by MARCUS was discussed. Doubts as to the chemical purity and reproducibility of ion-exchange resins (see Minutes of Commission at 23rd Conference, para. 1) were repeated. However, it was agreed that the compilation was undoubtedly useful and should be finalized, but that it should be published separately from the MARTELL-SILLÉN Supplement. It was suggested that the trade names of resins and the degree of loading should be added and also values of equilibrium constants in the resin phase.

(7) *Tables of Critical and/or Selected Values of Constants*

Doubts as to the feasibility of this project were widely expressed. However, it was understood that SILLÉN and HÖGFELDT had compiled a selected list for student use at the Royal Institute of Technology in Stockholm. It was agreed to ask SILLÉN if he would distribute this compilation to the Commission as a basis for further discussion.

(8) *Critical Survey of Stability Constants of Cyano Complexes*

BECK had circulated a preliminary report as a sample of an alternative to a critical tabulation of constants. This approach was welcomed and members of the Commission are invited to send comments on the draft to BECK before 31 January 1968. It was agreed that the Commission should attempt to stimulate the writing of similar surveys, e.g. on hydroxide; fluoride; chloride; bromide; iodide; thiocyanate, cyanate and azide; phosphate; sulphate; nitrate and perchlorate; ammonia; polyamines; acetate; oxalate; tartrate; citrate; glycine; NTA; EDTA; and phthalate systems. Anyone who is willing to write such surveys should be asked to write, in the first instance to the Chairman so that duplication of effort can be avoided. It was considered that publication of these surveys might be most suitable in *Coordination Chemistry Reviews* and that the views of its editor should be sought by the Secretary.

(9) *Division Nomination/Election Rules*

The draft was discussed and amongst the amendments proposed was the suggestion "that membership shall represent a broad geographical distribution in which no country shall have more than two members".

(10) *Finance*

A sum of \$200 was requested as a contribution towards secretarial expenses incurred in the preparation of our several tabulations. The possibility of obtaining a grant of US Counterpart Funds, use of which is restricted to Israel, from the Office of Critical Tables of the US National Research Council was discussed and the Chairman asked to continue negotiations.

F. J. C. ROSSOTTI, Secretary

Place and date: Prague, 30 and 31 August 1967

Present: Dr G. B. COOK (Chairman), Dr W. W. MEINKE (Secretary), Dr M. B. CRESPI, Prof. J. MINCZEWSKI, Dr A. A. SMALES, Prof. F. HECHT (Associate Member).

This was the first meeting of the new Commission which was created at the 23rd IUPAC Conference in Paris in 1965. Since its creation, the Commission has evolved its programme by correspondence. The first part of the present series of meetings was devoted to consideration of the work already performed, and the second part to a reconsideration of the programme initially outlined by the *Ad-hoc* Working Committee in the light of the experience obtained in the elapsed two years.

Projects already initiated include:

(1) *Purity of Commercial Radioactively Labelled Preparations*

This project has been given high priority by the Commission on the basis of an approach by the Joint Commission on Applied Radioactivity of the International Council of Scientific Unions, which had been considering this problem for some years. An international enquiry by questionnaire was made to establish the extent of current concern with the problem. The approximately 70 answers received from 16 countries were discussed at the present meeting. Since it appears that definite dissatisfaction does exist in many cases with the purity of labelled compounds presently available, the Commission decided to summarize its findings in a report, after collecting more information on some of the examples identified in the questionnaire.

(2) *Publicity for Radioactive Methods in Analytical Chemistry*

The Commission feels that the use of tracers in analytical chemistry has been hindered by a lack of appreciation of its advantages by the non-specialist. An outline of a monograph along these lines which would develop the appropriate perspective for analytical chemists was prepared, discussed and agreed upon. Schedules were developed for preparation of the full manuscript for circulation among, and consideration by, the Commission members.

(3) *Intercomparison of Analytical Methods*

(a) The work already done, in collaboration with the IAEA, on the establishment of the uranium content of four types of low-grade ores, especially homogenised for the purpose, was considered. It was agreed that a draft report on this work should be written for circulation among members of the Commission with a view to eventual publication by IUPAC.

(b) The state of an intercomparison, planned by IAEA, on trace impurities in uranium oxide was considered. It was reported that difficulties had appeared in the attainment of homogeneity of the sample of 100 kilograms and the project is delayed until the problem is solved.

(4) *Reference Materials for Activation Analysis*

The international enquiry conducted by the Commission on the necessity for such materials was considered. Answers from 55 laboratories in 17 countries showed that a real need exists, especially for metals, inorganic compounds and biological materials. It was decided to check by an international cooperative laboratory effort whether some materials already available from the US-NBS as reference materials for chemical purposes could also be used in the activation analysis field.

Future projects:

A reconsideration was made of the original Report of the *Ad-hoc* Working Committee on the Creation of Commission V.7 (23rd Conference IUPAC, Paris 1965). By the evidence available from the work of the Commission it was decided to modify the suggested programme, omitting some minor projects and concentrating the future activities of the Commission on the following projects not yet started.

(5) Summary Survey of Special Problems in the Analysis of Nuclear Materials

Discussions during the meetings showed that the limits of reliability of analysis of many nuclear materials are not widely understood, and it was agreed that a report on the state of the art of the most important problems in this area would be useful and should be prepared. An outline of a few examples will be prepared for consideration by the Commission as a basis for a broader survey in the future.

(6) Source Materials for Radiochemistry

It was pointed out to the Commission that although publications already exist listing the most important basic references for radiochemistry in the English language, very little in the way of such summaries is available in other languages. The Commission considered that the extension of this approach to other languages was a worthwhile project and agreed to extend the efforts of the Chairman who had already initiated a similar enterprise.

(7) National Regulations of the Use of Small Quantities of Radioisotopes

The Commission discussed the possibility that the development of the use of radioisotopes in small quantities in analytical chemistry might be hindered by strict national regulations concerning the use of radioisotopes in general. The Commission decided, as a first step in exploring the problem, to obtain some information on national regulations regarding the use of radioisotopes.

(8) Reagents of Abnormal Isotopic Composition

As a result of nuclear industry activities, chemical suppliers have on occasion used materials of abnormal isotopic composition to prepare reagents. This problem is particularly noticeable in compounds of boron, lithium and uranium, and it is known to have caused difficulties when the manufacturer has not indicated the source of the material. It was decided that the Commission should bring this problem to the attention of chemical manufacturers throughout the world.

"Dissociation constants of inorganic acids and bases in aqueous solutions". The manuscript, submitted at short notice, was approved in principle subject to postal confirmation by the Division Committee.

(9) Nomenclature

The Commission felt that, since it is the only titular Commission in IUPAC with direct concern for nuclear matters it must accept the responsibility for attempting to clarify nomenclature problems. As a first step, it was decided to prepare a list of terms in different languages which will require more precise definition for usage in the field of chemistry.

G. B. COOK, Chairman
W. W. MEINKE, Secretary

VI. DIVISION DE CHIMIE APPLIQUÉE

Rapport sur l'activité

*depuis la XXIII^e Conférence (Paris, juillet 1965)
jusqu'en mai 1967*

par le Professeur RENÉ TRUHAUT, Président de la Division

Ayant développé dans mon rapport d'activité au Bureau, puis au Conseil de l'IUPAC en juillet 1965 à Paris, lors de la XXIII^e Conférence, des généralités sur les objectifs de la Division, je me bornerai, dans ce rapport, à présenter un compte rendu sommaire de l'activité des différentes Sections de la Division, en me basant sur les rapports que m'ont adressés leurs présidents. J'ai volontairement exclu les projets de modifications dans la composition des Sections et des Commissions qui y sont rattachées, projets qui doivent être discutés lors de la Conférence de Prague et feront ensuite l'objet d'un rapport spécial de ma part où seront également indiqués les programmes d'activité future de chacune des Sections.

VI.1 Section de Bromatologie ou Section d'Alimentation

Le programme d'études de cette Section, présidée par le Dr B.L. OSER (Etats-Unis), a été poursuivi par l'intermédiaire de ses 2 Commissions.

VI.1.1 Commission des Additifs aux aliments

Président: Prof. A.C. FRAZER (Royaume-Uni)

Cette Commission, qui s'est réunie à Hambourg en août 1966, a continué ses enquêtes sur les méthodes analytiques à mettre en œuvre pour la détermination de 17 additifs sélectionnés dans les denrées alimentaires. Le rapport final sera présenté à la Conférence de Prague et comprendra, en dehors de l'indication des principes de chacune des méthodes, des informations sur les techniques préliminaires de purification.

VI.1.2 Commission des Substances à l'état de traces

La Commission, présidée par le Dr H. FISCHBACH (Etats-Unis), comporte 2 Sous-Commissions qui se sont réunies à Hambourg en août 1966.

VI.1.2.1 Sous-Commission des Mycotoxines

Elle a poursuivi son travail coopératif en 3 stades commencé en 1965. Le dernier stade est en cours d'achèvement et les propositions finales de la Sous-Commission en ce qui concerne le dosage des aflatoxines dans les denrées alimentaires seront présentées très prochainement. Parallèlement, un travail considérable a été effectué pour l'établissement d'étalons d'aflatoxines.

VI.1.2.2 Sous-Commission des Aliments fumés

La Sous-Commission s'était fixé comme objectif l'étude des hydrocarbures aromatiques polycycliques potentiellement cancérogènes dans les aliments fumés. Elle a, conformément aux recommandations de la Section d'Alimentation, limité ses travaux à l'établissement d'une méthode de dosage du plus courant des hydrocarbures cancérogènes, le benzo (a) pyrène (benzo 3,4 pyrène), et a coordonné dans ce but des essais, dans divers laboratoires, de la méthode proposée par la « Food and Drug Administration » des Etats-Unis, dont la sensibilité est évaluée à 2 parties par billion. Les difficultés, tenant à l'absence des réactifs et de l'équipement nécessaires dans certains pays, ont conduit la Sous-Commission à s'associer activement à une enquête coopérative du même type organisée, à l'échelle internationale, par l'« Association of Official Analytical Chemists » des Etats-Unis. Il est probable que les résultats de cette enquête pourront justifier la recommandation d'une méthode de référence sous l'égide de l'IUPAC.

VI.2 Section des Industries de Fermentation

Cette Section, présidée par le Dr H. SUOMALAINEN (Finlande), s'est réunie à Paris en septembre 1966. Elle a publié en 1966, dans le Journal de l'IUPAC, les résultats de son enquête à l'échelle mondiale sur les industries de fermentation (boissons alcoolisées, spiritueux, solvants organiques, acides organiques et amino-acides, aliments pour l'homme et les animaux à base de levure, enzymes, antibiotiques, additifs aux aliments de l'homme et des animaux, produits divers...).

Elle a poursuivi activement ses études pour la standardisation internationale des modes d'expression de la teneur en alcool des boissons alcoolisées et des spiritueux. Le rapport matérialisant les résultats de ces études sera présenté à la Conférence de Prague et soumis ensuite à la publication. La Section a également effectué un travail coopératif en vue d'arriver à une standardisation internationale de la mesure d'activité des levures sèches de boulangerie. Les résultats de ce travail seront présentés à la Conférence de Prague.

VI.3 Section des Matières grasses

Cette Section, présidée par le Prof. BOEKENOOGEN (Pays-Bas), s'est réunie à Dublin en septembre 1966, et a, par ailleurs, entretenu une liaison active avec les autres organisations internationales engagées dans l'étude des méthodes d'analyse des matières grasses, notamment avec l'ISO. Elle a continué très activement les études énumérées dans mon rapport de 1965.

Ont été approuvées, à la suite des travaux poursuivis et des échanges de résultats et de vues entre les membres, soit lors de la réunion de Dublin, soit par correspondance, les méthodes d'analyse suivantes :

- détermination des pieds (« foots ») dans l'huile de lin
- mesure de la dilatation des matières grasses
- détermination de la courbe de solidification des matières grasses concrètes
- détermination de l'indice de Kirschner
- détermination de la teneur en groupes époxydes des matières grasses
- détermination des stérols dans les huiles et les graisses par chromatographie en phase gazeuse

Ces diverses méthodes ont fait l'objet de la rédaction de fiches techniques qui vont être soumises à la publication dans un proche avenir.

En outre, des études sur toute une série de méthodes d'analyse ont été poursuivies et leurs résultats seront discutés lors de la réunion de la Section à l'occasion de la Conférence de Prague.

En ce qui concerne les publications, les méthodes suivantes sont parues :

- dosage des monoglycérides
- dosage de faibles teneurs en eau par application de la méthode de Karl Fischer modifiée
- mesure de l'indice de benzidine
- dosage du phosphore dans les huiles et les graisses
- dosage du glycérol dans les savons

VI.4 Section des Eaux, Eaux d'égout et Eaux résiduaires industrielles

Le Conseil de l'IUPAC ayant décidé, lors de la Conférence de Paris, de réorganiser cette Section, dont le mandat comporte l'étude de problèmes de contrôle analytique extrêmement importants à l'échelle internationale, j'ai, comme j'y avais été invité par le Conseil et le Bureau, pris, en liaison avec le Dr R. MORF, les contacts nécessaires pour donner à cette Section une composition qui soit le garant de son efficacité. Cette tâche s'est révélée délicate et difficile. Finalement, le Dr STIG FREYSCHUSS (Suède) a accepté de prendre la présidence de la Section et de présenter ses propositions en ce qui concerne sa composition et son programme d'activité au Comité de la Division de Chimie Appliquée, lors de sa réunion à la Conférence de Prague.

VI.5 Section de Toxicologie et d'Hygiène industrielle

La Section, présidée par le Dr J. GAGE (Grande-Bretagne), a poursuivi ses études pour l'établissement de méthodes normalisées pour le dosage de toxiques industriels ou agricoles dans les ambiances de travail ou dans les prélèvements de matières biologiques (urine, sang, air expiré) effectués sur les sujets professionnellement exposés (avec, dans ce dernier cas, étude des produits de transformation métabolique ou d'épiphénomènes d'imprégnation toxique). Les études ont porté

- sur le dosage *dans l'air* des toxiques suivants: acide chlorhydrique, acide fluorhydrique, acide sulfurique, hydrogène sélénié, hydrogène phosphoré, ozone, benzène, chlorure de méthyle, poussières plombifères, cadmium
- sur le dosage *dans le sang* de l'oxyde de carbone, du benzène et des cholinestérases
- sur le dosage *dans l'urine* des phénols, des métabolites du trichloréthylène et du plomb

Les résultats de ces études ont fait l'objet d'échanges de vue par correspondance et seront discutés à la Conférence de Prague.

La Section a continué d'entretenir une coopération active avec les grandes organisations internationales engagées dans l'étude des problèmes d'hygiène industrielle, notamment avec l'Organisation mondiale de la Santé, l'Organisation internationale du Travail et la Commission internationale permanente de Médecine du travail qui ont sollicité son aide pour l'étude de problèmes de contrôle analytique et fait appel au concours de ses membres, notamment le Dr GAGE et moi-même, pour les travaux de plusieurs comités d'experts.

Cette coopération s'étendra, dans un proche avenir, à l'étude de méthodes de détermination de polluants potentiellement toxiques présents dans l'air des cités ou des environnements de complexes industriels.

En ce qui concerne les publications, des méthodes normalisées sont en cours de parution pour les toxiques suivants:

- anhydride sulfureux, acétone, trichloréthylène et mercure *dans l'air*
- arsenic et mercure *dans l'urine*

VI.6 Section des Pesticides

J'ai exposé dans mon rapport de 1965 les objectifs d'une extrême importance à l'échelle internationale, en liaison avec l'OMS et la FAO et leur Commission du Codex Alimentarius, adoptés par cette Section sous la direction de son président, le Dr H. HURTIG (Canada). Ils visent essentiellement à l'établissement de méthodes d'analyse normalisées pour la détermination des résidus de pesticides dans les *denrées alimentaires*, dans un contexte de coordination et de coopération avec diverses organisations internationales. Pour les atteindre, 2 Commissions ont été constituées, avec l'accord du Conseil et du Bureau, dont le Secrétariat commun est assuré par le Dr H. EGAN (Grande-Bretagne).

VI.6.1 Commission d'étude de la nature chimique des résidus terminaux de pesticides (Président: Dr HURTIG, Canada).

VI.6.2 Commission pour le développement, l'amélioration et la normalisation des méthodes d'analyse de résidus de pesticides (Président: Dr R. A. E. GALLEY (Grande-Bretagne).

La Section et les 2 Commissions se sont réunies à Genève dans les locaux de l'OMS, en novembre 1966. Les comptes rendus de ces réunions, qui ont donné lieu à de féconds échanges de vue et permis l'élaboration de programmes dynamiques d'activité tenant compte des ordres de priorité établis après consultation des industries intéressées, sont en cours de parution dans le Bulletin d'Information de l'IUPAC. Je me bornerai à mentionner très brièvement que

1° en ce qui concerne la nature chimique des résidus terminaux, ont été retenus pour des études prioritaires portant sur les produits de dégradation ou de métabolisme dans les plantes traitées, les pesticides suivants:

- carbamates insecticides, y compris le
- carbaryle
- chlordan
- dithiocarbamates fongicides
- piperonylbutoxyde et MGK 265
- lindane (gamma HCH)
- fumigants, y compris le dibrométhane, la chloropicrine et le nitrile acrylique

L'endosulfane, le dichlorvos (DDVP) et les insecticides organo-phosphorés en général ont également été considérés.

2° en ce qui concerne l'amélioration ou l'établissement de méthodes d'analyse normalisées, ont été retenus pour des études prioritaires:

- les insecticides organo-chlorés en général
- les fumigants insecticides
- les organo-mercuriels fongicides

Des groupes de travail ont été constitués pour chacune des trois dernières catégories. Ont été également considérés le diphenyle, le dichlorvos et le piperonylbutoxyde.

L'exécution de ce programme très vaste d'activité a été commencée et les premiers résultats seront soumis à discussion lors des réunions de la Section et des 2 Commissions qui se tiendront à Vienne du 27 au 29 août de cette année, à l'occasion du Congrès international de protection des plantes dont la date coïncide avec celle de la Conférence de Prague. Les conclusions seront présentées au Comité de Division de Chimie Appliquée lors de cette Conférence par 2 représentants mandatés de la Section.

VI.7 Section des Plastiques et hauts Polymères

Cette Section, présidée par le Dr G.M. KLINE (Etats-Unis), a poursuivi son activité conformément à la programmation prévue à la Conférence de Paris en juillet 1965. Le travail de classification des matières plastiques et des élastomères industriels a été terminé. Le texte allemand, préparé par le Dr O. LEUCHS, a été traduit en anglais et l'ensemble, accompagné d'une introduction, de conclusions et de recommandations, est prêt pour la publication. L'étude des propriétés mécaniques des diverses matières plastiques en fonction de divers paramètres a été poursuivie par le groupe de travail constitué à cet effet avec l'examen du polyéthylène et du chlorure de polyvinyle. Les résultats obtenus feront l'objet d'un rapport qui sera soumis à discussion lors de la réunion à l'occasion de la Conférence de Prague.

Sont en cours de préparation des compilations concernant les emplois des matières plastiques dans les principales industries et notamment dans les industries du bâtiment et de l'automobile, ainsi que les caractéristiques à exiger de ces matériaux pour les utilisations envisagées.

En ce qui concerne les publications, un travail intitulé «IUPAC Recommendations for abbreviation of terms relating to plastics and elastomers» est paru dans le n°25 (février 1966) du Bulletin d'Information de l'IUPAC. Une autorisation de publication dans les revues spécialisées a été demandée.

VI.8 Section des Revêtements de surface

Cette Section, présidée par le Dr H.K. RAASCHOU-NIELSEN (Danemark), a poursuivi ses travaux. Elle a publié dans le Journal de l'IUPAC (vol.10, n°III) 2 excellents rapports:

- l'un sur les méthodes recommandées pour l'analyse des huiles siccatives
- l'autre sur les méthodes d'évaluation de la dureté des revêtements organiques

Par ailleurs, sa Sous-Commission des Méthodes d'Essai a réuni à Copenhague en février 1966 les membres d'un groupe de travail sur les propriétés rhéologiques des peintures liquides qui a établi un programme d'études expérimentales devant être discuté à Prague.

Au sein de la Sous-Commission des Méthodes analytiques, le membre britannique a établi un rapport sur la détermination de l'acidité totale et du taux d'anhydride des résines comportant un examen critique préliminaire des méthodes existantes. Ce rapport, qui sera discuté à Prague, doit constituer la base de recherches expérimentales coopératives.

L'activité manifestée par cette Section doit être appréciée.

VI.9 Section du Papier, de la Pâte à papier et du Carton

Cette Section, présidée par le Prof. W. JENSEN (Finlande), a tenu, en liaison avec EUCEPA (Comité européen de liaison pour la cellulose et le papier), un symposium sur la dissolution des pâtes à papier, patronné par l'IUPAC, à Helsinki en mai 1966. 260 experts de 25 pays ont participé à ce symposium dont les comptes rendus, comportant 27 exposés, sont en cours de publication dans le Journal de l'IUPAC.

La Commission pour l'Analyse chimique des papiers a continué à rassembler des informations sur les méthodes analytiques, en vue de choisir et de recommander les techniques les plus valables.

*

En ce qui concerne l'activité du Comité de Division, il convient d'y inclure l'établissement et le commencement d'exécution du programme de coopération avec la Communauté Économique Européenne. J'ai présenté un rapport sur ce sujet à la réunion du Comité exécutif tenue à Scheveningen (Pays-Bas) à la fin du mois de mars de cette année, rapport dont le résumé figure dans les comptes rendus de cette réunion et qui donne, je pense, une idée claire de l'ampleur de la tâche effectuée en liaison avec le Dr MORF. J'ajouterai qu'au niveau de la Direction du Comité de Division, aucun effort n'a été épargné pour développer une coopération active avec l'Industrie pour l'exécution des tâches incombant aux différentes Sections. Cette liaison, qui m'a paru procurer une grande satisfaction aux industries intéressées, s'est avérée extrêmement bénéfique sur le double plan scientifique et pratique. Elle matérialise le programme de collaboration avec les experts de l'Industrie dont j'avais souligné les grandes lignes dans mon rapport au Bureau de l'IUPAC à Bâle en mars 1964, rapport qui avait été, à l'époque, publié dans le Bulletin d'Information n° 21 de l'IUPAC.

signé: R. TRUHAUT

VI.1.1 FOOD ADDITIVE COMMISSION

Report to the President

The Food Additive Commission met 30 August 1967, at the Hotel International, Prague. The draft final report on the "Survey of methods of quantitative determination of certain food additives in food" was considered in detail and a number of amendments, mainly of an Editorial nature, were proposed. Arrangements have been made for the Report on this Survey to be completed by 1 October 1967. The Commission then completed the Agenda and submits the following recommendations:

(1) That the final Report of the Survey, referred to above, should be submitted for approval to the Council in October, 1967, and that, if approved, it should be published as soon as possible.

(2) That this task shall be considered to be completed when the Report has been submitted to Council and published.

(3) That arrangements should be made to provide reprints of this publication and that the members of the Commission should arrange for appropriate publicity in their respective countries.

(4) That the Food Additive Commission should be continued.

(5) That the Food Additive Commission should undertake the following tasks as soon as possible:

– A survey of and report on the organic solvents used in food technology, with special reference to specifications to ensure adequate purity and the methods of analysis necessary to ensure their safe use.

– Formulation of specifications and methods of analysis for food additives acceptable to the EEC and as indicated by the Coordinating Committee. It is hoped that this exercise in relation to a relatively limited group of countries in the interests of international trade may pave the way to a more extensive harmonization of food additive specifications and related methods of analysis at a later date.

(6) That the Food Additive Commission should examine the extended list of food additives originally considered by them, the Reports of the Joint FAO/WHO Expert Committee on Food Additives and the Report of the Codex Alimentarius Committee, and compile a further list of food additives for which methods of quantitative determination in food might be considered to be important in the interests of international trade.

A. C. FRAZER, Chairman

**MINUTES OF THE FOOD ADDITIVE COMMISSION,
August 1967**

(1) The Food Additive Commission met at the Hotel International, Prague, on Wednesday, 30 August 1967, at 9 a.m.

(2) *Present:* A. C. FRAZER (Chairman), B. L. OSER, J. F. REITH, S. W. SOUCI and D. W. KENT-JONES; R. TRUHAUT (for a part of the meeting).

Apologies were received from E. J. BIGWOOD and A. FRANÇOIS.

(3) The Minutes of the previous meeting held in Hamburg in July 1966 having been previously circulated, were taken as read and confirmed.

(4) A draft Report on the "Survey of the method of analysis for the determination of certain food additives in food" was read and discussed in detail. The following proposals were agreed:

- That a preamble should be added. This should be along the lines of that previously considered in the Interim Report, which would give a clear picture of the various steps the Commission had taken to obtain information.
- That a statement of the sources of information used for compilation of this Report should be made.
- That a number of editorial corrections should be inserted.
- That the references should be carefully checked. Prof. REITH and SOUCI undertook to do this.

(5) A plan of action was agreed:

- Amended Report with corrected references to be submitted for publication in IUPAC Bulletin in October 1967. Preamble to be circulated before then and corrected references to be submitted to the Chairman.
- Members of the Commission agreed to assist with publicity of the Report in their respective countries.

(6) The future work of the Commission was discussed. *It was agreed* that the Commission should continue and that it should deal:

- With the specifications required to ensure the safe use of solvents employed in food technology (Reference from FAO/WHO Expert Committee on Food Additives).
- With the specifications and methods of analysis of food additives as listed by the Coordinating Committee (Chairman: Prof. TRUHAUT) and accepted by EEC.
- With any further food additives for which methods of analysis in food are needed in the interests of international trade.

(7) *It was recommended* that the name of the Commission should be changed to "Commission on Food Additives and Contaminants".

(8) The meeting was closed at 4.30 p.m.

A. C. FRAZER, Chairman

(1) Stage III of a collaborative study is only partially completed. The third stage of this study culminates a two-year effort by the Sub-Commission. Dr JONES has received 8 returns from 17 participating laboratories (he expects to receive the remaining data within the next two weeks). The reported results from the 8 laboratories demonstrate better agreement between the collaborative laboratories than was evident in Stage III. The two methods studied were similar in extraction procedures but were different in the defatting and clean-up step, and in the TLC determinative step (one using an extinction technique and the other a direct comparison with standards).

Recently the Association of Official Analytical Chemists completed a collaborative study involving 13 participating laboratories representing industry and Government laboratories in the United States. The method studied was the same as the CB Procedure used in the Stage III study which uses internal standards. In the AOAC study the mean coefficient of variation (standard deviation $\times 100$)

average for the determination of Aflatoxin B₁ over the range 20 to 45 $\mu\text{g/kg}$ was close to 40% whether calculated between laboratories or within a laboratory.

Although the method is by no means ideal, the Sub-Commission recommends that if the remaining data received by Dr JONES is acceptable, the CB Procedure (to be called a tentative or provisional IUPAC method) be adopted as a tentative or provisional procedure for the determination of the aflatoxins (not Aflatoxin M) in peanuts, peanut butter, and peanut meal. Although whole peanuts were not included in any of the studies because of the difficulty in preparing homogeneous samples, whole peanuts should be reduced to a paste for sampling, and from then on can be handled as peanut butter. Any suitable comminuting mill may be used for reducing the peanuts to a paste. Mills for grinding grain have been found satisfactory.

This tentative IUPAC method is based on analytical principles developed in the laboratories of the Tropical Products Institute, Lever Bros. (Holland and England), and the Food and Drug Administration.

(2) The stability of the standards still poses some unsolved problems. Consequently the Sub-Commission recommends that each laboratory periodically check the standards by the procedure outlined in Appendix A of the "Provisional IUPAC Method."

(3) The Sub-Commission will continue to pay attention to the problem of stability of standards.

(4) The Sub-Commission recommends the adoption of a chemical confirmation procedure for Aflatoxins B₁ and G₁, as described in JAOAC 50, 214-216 (1967) and the results of a collaborative study JAOAC 50, 354-360 (1967).

(5) Dr PURCHASE reported that he has encountered considerable difficulty with the instability of Aflatoxin M; apparently it is less stable than Aflatoxin B₁. The efforts of his laboratory will be directed toward producing enough Aflatoxin M to solve the instability problem and then to proceed with the further development of a practical method.

(6) Because the Orient has a tradition of preparing a variety of fermented foods, it was felt that an appropriate Japanese scientist should be invited to join the Sub-Commission on Mycotoxins as an Associate Member. (The Food Section will recall that in a previous discussion of this point, it was

decided that Prof. A. FRAZER would invite Prof. IKUZO URITANI, Nagoya University, Chikusa, Nagoya, Japan).

(7) *Holaday Procedure*: The Sub-Commission is aware of a rapid screening procedure for aflatoxins in whole nuts being developed by CHARLES E. HOLADAY of the US Department of Agriculture (MQD, ARS). Because of the speed and simplicity of the procedure, efforts to improve the technique are continuing.

(8) Because of the heavy burden associated with the two Sub-Commissions, the Chairman of the Trace Substances Commission recommends that Dr N. R. JONES be formally appointed as Chairman of the Sub-Commission on Mycotoxins, if this is permissible within the framework of IUPAC.

HENRY FISCHBACH, Chairman

VI.1.4 Sub-Commission on Smoke Constituents

(1) The Sub-Commission finds itself confronted with an awkward and difficult problem. A number of laboratories in important European countries do not have available to them certain key chemical reagents. Nevertheless the Sub-Commission agreed at this point in time to recommend the adoption of a tentative or provisional procedure for benzo(a)pyrene based on the Howard Procedure described in Appendix D. This procedure recently studied in a collaborative exercise among 11 laboratories in the United States (Government, industry, and university) demonstrated standard deviations of 11.5 and 8.9 at the 4 $\mu\text{g/kg}$ level and standard deviations of 8.8 and 12.4 at the 10 $\mu\text{g/kg}$ level in smoked fish and smoked ham. The procedure has demonstrated a sensitivity of 2 $\mu\text{g/kg}$.

(2) Prof. TILGNER and Dr MILER will attempt to adapt or develop a procedure for benzo(a)pyrene in smoked foods which utilizes the chemical reagents available to the Central European countries, and which will demonstrate a sensitivity equal to the proposed tentative IUPAC Method (Appendix D); i.e. 2 $\mu\text{g/kg}$.

(3) The Sub-Commission will give attention to a multi-detection method for polycyclic aromatic hydrocarbons in smoked foods if it is practical to supply some of the collaborating laboratories with the required chemical reagents.

HENRY FISCHBACH, Chairman

VI.2 Fermentation Industries Section

At the XXIVth Conference of the IUPAC in Prague the Fermentation Industry Section met to discuss progress of the program and to plan future work for the section.

In 1965 a study intended to provide uniform or standard methods of alcohol determination and expression was begun. At the meeting in Prague the resulting proposal was discussed and, with minor change, it is expected that the final report will be released for publication in September 1967.

A report was presented on the program, begun in 1966, which had the objective of developing standards for the determination of activity of dry bakers' yeast. The results of a cooperative study by 23 industrial and government laboratories demonstrated the variability of existing methods. The study is being continued with the objective of defining procedures which may give a reliable measure of the quality of dry bakers' yeast.

The section proposes to continue on a periodic basis the statistical survey of the World Fermentation Industry which was first undertaken in 1963. A convenient time interval is four years and the next report will be based on operating data for 1967.

Among other problems of international concern, that of pollution was considered since some representatives of the fermentation industry have, in the past, contributed to this problem. Though a definitive proposal for section activity was not developed, the section membership will continue consideration of the problem and will discuss it with the newly reorganized Water, Sewage and Industrial Wastes Section as well as with local governmental and other authorities. The subject was carried over for discussion at the 1968 meeting of the section.

Preparation of a directory listing laboratories and research institutions engaged in fermentation research and development was proposed. This proposal will also be developed further during the coming year for consideration and action by the Section in 1968.

The next meeting of the Section is planned for September 1968 to coincide with the IIIrd International Fermentation Symposium which is scheduled for September 1968 at Rutgers University in New Brunswick, NJ, USA. The Symposium is sponsored by the Fermentation Industries Section of IUPAC.

VI.3 Section des Matières Grasses

La Section des Matières Grasses s'est réunie à Prague les 30 et 31 août 1967 afin de discuter les résultats des recherches comparatives faites en 1966/67 et pour fixer des méthodes unifiées. Environ 30 personnes provenant de 14 pays ont participé à cette réunion.

Dans son rapport le président a annoncé que pendant la période passée les liaisons entre la Section et les autres organisations internationales sont améliorées et que lors du Congrès de la "International Society for Fat Research" (ISF) à Budapest en octobre 1966 le président et le secrétaire de la Section ont discuté les problèmes de standardisation avec membres des diverses organisations (Office hongrois de Normalisation, Association française de Normalisation, British Standards Institution, Conseil Oléicole International). M. le Prof. PAQUOT, membre de la Section, a représenté la Section à la Réunion de la Commission ISO/TC 91 "Agents de Surface", qui s'est tenue à Lisbonne en octobre 1966. Par l'intermédiaire de l'ISO, l'Association internationale de la Savonnerie et de la Détergence (AIS) a participé à nos études concernant le dosage de faibles teneurs en glycérol dans les savons. De la part du Codex Alimentarius/FAO la Section a reçu la demande de donner des informations en ce qui concerne le dosage des époxydes dans les lécithines.

Quant aux aspects financiers liés à l'activité de la Section, il faut souligner que le Secrétariat a réussi à ne pas surpasser la subvention annuelle de \$800, qui était demandée pour les frais.

L'état actuel des activités est le suivant :

Composition de la Section

La Section a approuvé par l'unanimité le renouvellement de fonction du Secrétaire, dont la fin du mandat était arrivée en 1967. Il sera Secrétaire jusqu'au 1971. M. le Dr J. A. CORNELIUS (Angleterre) est nommé comme Membre associé, ainsi remplaçant M. de Dr RAYMOND. La Section a approuvé la nomination de M. le Dr-ing. E. HEINERTH (Allemagne) comme Membre (Représentant national) de la Section.

Les textes des méthodes suivantes sont en préparation:

- Dosage de l'insaponifié-insaponifiable dans les savons.
- Dosage des acides gras di- et tri-insaturés par spectrophotométrie UV.
- Dosage du groupe époxy-.
- Indice d'acides volatils.
- Détermination de la courbe de solidification des matières grasses concrètes.
- Dosage des pieds dans l'huile de lin brute.

Pour l'année prochaine les études suivantes seront poursuivies:

- Séparation des tri-, di- et monoglycérides par chromatographie sur colonne.
- Dosage de faibles teneurs en glycérol dans les savons.
- Dosage de l'arsenic dans le glycérol.
- Détermination potentiométrique des indices d'acide et de saponification.
- Identification des stérols dans les huiles et les graisses par chromatographie en phase gazeuse.
- Examen des matières grasses concrètes par analyse thermique différentielle (ATD)

Comme nouveaux sujets seront étudiés

- Dosage de la teneur en savon dans les savons.
- Détermination des acides "trans" (acide élaïdique) dans les corps gras.
- Dosage des pesticides organo-chlorés dans les huiles et graisses.
- Détection du suif dans le saindoux par chromatographie en phase gazeuse.

La prochaine réunion de la Section aura lieu en octobre 1968 à Vienne (Autriche) sur invitation amicale de nos membres autrichiens sans frais pour l'IUPAC.

H. A. BOEKENOOGEN, Président de la Section

VI.6 Pesticides Section

Report on the Work

(1) Both Commissions of the Pesticides Section have met on two occasions, on 25-26 November 1966 in Geneva and on 27-29 August 1967 in Vienna. A large amount of new, and in many cases unpublished, information has been received and evaluated by each Commission. The need for these evaluations has largely stemmed from problems indicated in the 1965 and 1966 joint FAO/WHO Reports on Pesticide Residues and this work is still in progress.

(2) The Commission on Terminal Residues has been concerned with the evaluation of information on the nature of terminal residues of gamma-BHC, chlordane, cyclodienes, carbamates, dichlorovos, dithiocarbamates, various fumigant chemicals, rethrans and synergists, and of organophosphorus compounds. For this purpose, a number of working groups have been formed under the coordination of members or associate members of the Commission.

(3) The Commission on Residue Analysis has been engaged on the evaluation of information on methods of residue analysis for organochlorine compounds, organophosphorus compounds, organomercury compounds, various fumigant chemicals, rethrans and for diphenyl. The Commission has noted the proceedings of the International Atomic Energy Agency Symposium on Mercury Contamination in Man and His Environment, held in Amsterdam in May 1967, and has expressed its willingness to assist in

analytical aspects of international collaboration should this be initiated. This Commission also has formed a number of working groups to further its work.

(4) It has in a number of cases been possible to be reassured that work is in progress on the problems of residue analysis on terminal residues which have been encountered. In other cases the Commissions have initiated work; but there are other areas in which difficulties in initiating such work are foreseen. The Commissions regard the furthering of this matter as an important aspect of their work.

(5) The proceedings of the first meetings of both of the Commissions will be published in the October 1967 issue of the Journal of the Association of Official Analytical Chemists. Over 300 copies of these minutes have been already distributed; but a further 500 reprints at an estimated cost of \$100 will be available in due course. These minutes will include details of much of the working evidence which has been received and the Commissions' evaluation of this. A much greater volume of working evidence has been received for the second meetings of the Commissions and whilst it is hoped to publish a summary of this and its evaluation in the same journal at an early date, the Commissions are of the opinion that this would best be done as a special IUPAC publication and propose that suitable arrangements with Messrs Butterworth be made for this.

(6) The Commissions are next due to meet in June 1968 in London.

H. EGAN, Secretary to the Commissions

VI.8 Organic Coatings Section

Report on meetings during the Prague Conference

The Section met on 30 and 31 August.

Present: Mr H. K. RAASCHOU NIELSEN, Chairman (Denmark); Dr REINT BULT, Secretary (Netherlands); Mr P. H. FINK-JENSEN (Denmark); Mr M. A. GLASER (USA); Prof. Dr K. HAMANN (Germany); Dr M. HOCHWEBER (Switzerland); Dr M. I. HUSS (Sweden); Dr J. A. W. VAN LAAR (Netherlands); Dr L. A. O'NEILL (UK); Dr K. H. OESTERLE (Switzerland); Prof. Dr D. PAGANI (Italy); and Dr D. WAPLER (Germany).

Furthermore, the director of the Czechoslovakian Research Institute for Synthetic Resins and Lacquers in Pardubice, Mr Z. ORDELT, was present during two of the sessions.

Before the opening of the meeting, one minutes silence was observed in memory of Mr L. R. HICKSON, who passed away on 9 January 1966. Mr HICKSON had been a very active member of the Sub-Committee on Testing Procedures.

(1) Minutes of previous meeting

The minutes of the meeting in Prague on 1, 2 and 3 July 1965 were approved by the members without change.

(2) Report on activities of the Organic Coatings Section

The chairman reported on the difficulties in connection with the publication of the "Hardness Testing of Organic Coatings" and "Standard Methods for the Analysis of Drying Oils", which had been published in "Pure and Applied Chemistry" at the end of 1965, and informed the members about his

correspondence in connection with this matter with the president of the IUPAC, Prof. KLEMM. The number of reprints of these publications sold was very unsatisfactory, and it was decided that the members of the section should do their best to make more publicity for these reports.

There was considerable interest in Germany for having the Hardness publication translated into German, and the possibility for such a translation was discussed at length.

(3) *Activities of the Sub-Committee for Testing Procedures*

At the Paris meeting it had been decided to set up a program for further work on the rheological properties of liquid paints. Such a program was worked out at an interim meeting in Copenhagen in February 1966 by BOERS, BULLETT, FINK-JENSEN and RAASCHOU NIELSEN, but due to criticism of the program and other factors the actual work was never started. It was decided that FINK-JENSEN and RAASCHOU NIELSEN who had been responsible for the work so far carried out should prepare a publication on this part of the work, to be discussed at an interim meeting next spring.

(4) *Activities of the Sub-Committee on Analytical Methods*

Dr O'NEILL had sent out a report on the determination of the total acidity and the anhydride content of alkyd resins. None of the members of the Sub-Committee had reacted to this report, however, and no further work had been carried out since the Paris meeting.

(5) *The Future of the Organic Coatings Section*

Because of the increased international activity in the organic coatings field on many fronts outside of the IUPAC, and because of the present dissatisfaction of the members caused by the difficulties encountered in connection with the publication of the reports on Hardness and Analytical Methods, the chairman had been asked during the Prague conference to raise the question: "Can the continued existence of an Organic Coatings Section within the IUPAC be justified?"

It was concluded during the meeting that the work of these other international organizations, many of which were not truly international, but Western European, did not interfere with the aims and possibilities of an Organic Coatings Section within the IUPAC, and that for this reason their existence could not justify the dissolution of the section. It would, however, be necessary for the members to reconsider the general policy of the Organic Coatings Section.

It was agreed that it would be necessary in the future to put more emphasis on the international aspects of the section.

As suitable topics to be dealt with in the Organic Coatings Section the following were discussed:

- Supplying the scientific background for the practical standardization work carried out in the International Organization within the organic coatings field.
- Supplying the scientific background for specific topics of international importance for the organic coatings industry.
- Standardization of modern analytical methods, not dealt with by ISO Terminology, including definition of terms.
- Education, specifically post graduate training.

The very important question about how the results of the activity of the section were to be brought to fruition was also discussed and it was agreed that the following ways were possible:

- Preparation of reports
- Preparation of books and monographs
- Drawing up recommendations to the ISO
- Arranging symposia on specific topics

In addition, it was agreed that a great need existed for more international cooperation within the organic coatings field, not only between paint research institutes, but also between chemists from individual firms, and that the OCS can play an important part in this connection.

It was finally decided that the following subjects would be dealt with by the members before and during the planned interim meeting next year:

- Rheological properties of liquid paints
- Adhesion of paint films
- Post-graduate training within the organic coatings field
- Analysis of alkyd resins

(6) *Membership* see page 77.

H. K. RAASCHOU NIELSEN, Past-Chairman

VI.9 Pulp, Paper and Board Section

(1) Present were, of the Titular Members: Prof. W. JENSEN, Chairman (Finland); Prof. L. STOCKMAN, Vice-Chairman (Sweden); Dr K. WARD, Jr., Secretary (USA); Dr J. GRANT (UK); Dr E. GRANDIS (Italy); Dr C. A. SANKEY (Canada).

Drs R. M. SCHEPP and Z. A. ROGOVIN were absent.

Dr J. HAVRÁNEK, Associate Member (Czechoslovakia), was present, and Dr M. SVATON, General Direction of the Pulp and Paper Industry, Praha (Czechoslovakia), as an observer.

(2) In accordance with IUPAC rules limiting the life of commissions, the Commission on Paper Analysis was discontinued.

(3) The Section Committee considered the over-all desirability of international conformity in matters of codification and standardization. The standardization of testing methods in our field is presently satisfactorily handled by ISO, to a larger extent by men active in the IUPAC Section. There are certain phases of the nomenclature which do not appear to be uniform. It was decided to explore the need and the possibility of setting up uniform nomenclature, definitions and symbols, especially the latter and, most important, correlating the systems for documentation, key-words and information retrieval in general. This initial exploration will be undertaken by the Section Committee including our associate members.

(4) The Section gratefully accepted Dr SVATON's offer of a visit to a local paper mill, Friday, 1 September.

(5) For the new Section Committee see page 78.

(6.1) The symposium in Helsinki, 13-17 May, is already 1968 arranged. The subject is: "Recovery of Pulping Chemicals."

(6.2) The symposium in Praha, 10-13 September 1968, is well under way. It is planned to have about 30 papers and 20 are already submitted. Details are being well taken care of by local committees. The subject will be: "Chemical aspects of Paper Making."

(6.3) Plans are being made for a symposium in 1971 in Boston on the subject of "Environmental Pollution"; it is hoped that we can cooperate with the new Section on Water and Sewage in this symposium.

Library
American Chemical Society

Library
American Chemical Society

